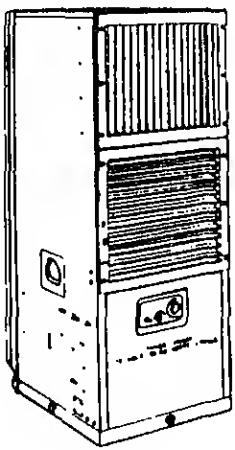
TECHNICAL MANUAL

OPERATOR'S, ORGANIZATIONAL, DIRECT SUPPORT AND GENERAL SUPPORT MAINTENANCE MANUAL

RETURN TO

R CONDITIONER, VERTICAL COMPACT
18,000 BTU/HR, COOLING
12,000 BTU/HR, HEATING
208 VOLT, 3 PHASE, 400 HERTZ
RVEY W. HOTTEL, MODEL CV-18-4-08)
4120-01-089-4054



CHAPTER 1	
CHAPTER 2	OPERATIN
CHAPTER 3	OPERATO
CHAPTER 4	ORGANIZATIONA
CHAPTER 5	DIRECT SUPPOR
CHAPTER 6	GENERAL SUPPOR
APPENDIX A	
APPENDIX B	COMPONENTS OF
APPENDIX C	MAINTENANCE ALL
APPENDIX D	ADDITIONAL AUTH
APPENDIX E	EXPENDABL
APPENDIX F	MANUFACTU
APPENDIX G	
	ALPH

HEADQUARTERS, DEPARTMENT OF THE ARMY

18 MAY 1982

The Metric System and Equivalents

Linear Measure

centimeter = 10 millimeters = .39 inch
decimeter = 10 centimeters = 3.94 inches
meter = 10 decimeters = 39.37 inches
dekameter = 10 meters = 32.8 feet
hectometer = 10 dekameters = 328.08 feet
kilometer = 10 hectometers = 3,280.8 feet

Weights

centigram = 10 milligrams = .15 grain
decigram = 10 centigrams = 1.54 grains
gram = 10 decigram = .035 ounce
dekagram = 10 grams = .35 ounce
hectogram = 10 dekagrams = 3.52 ounces
kilogram = 10 hectograms = 2.2 pounds
quintal = 100 kilograms = 220.46 pounds
metric ton = 10 quintals = 1.1 short tons

Liquid Measure

1 centiliter = 10 milliters = .34 fl. ounce
1 deciliter = 10 centiliters = 3.38 fl. oun
1 liter = 10 deciliters = 33.81 fl. ounces
1 dekaliter = 10 liters = 2.64 *gallons*
1 hectoliter = 10 dekaliters = 26.42 gall
1 kiloliter = 10 hectoliters = 264.18 gall

Square Measure

1 sq. centimeter = 100 sq. millimeters =
1 sq. decimeter = 100 sq. centimeters =
1 sq. meter (centare) = 100 sq. decimeter
1 sq. dekameter (are) = 100 sq. meters =
1 sq. hectometer (hectare) = 100 sq. deka
1 sq. kilometer = 100 sq. hectometers =

Cubic Measure

1 cu. centimeter = 1000 cu. millimeters =
1 cu. decimeter = 1000 cu. centimeters =
1 cu. meter = 1000 cu. decimeters = 35.3

Approximate Conversion Factors

To change	*To*	*Multiply by*
nches	centimeters	2.540
eet	meters	.305
ysrds	meters	.914
miles	kilometers	1.609
squsre inches	square centimeters	6.451
squsre feet	*square meters*	.093
square ysrds	square meters	.836
square miles	square kilometers	2.590
acres	square hectometers	.405
cubic feet	*cubic meters*	.026
cubic ysrds	cubic meters	.765
fluid ounces	millillters	29.573
pints	liters	.473
quarts	liters	.946
gallons	liters	3.785
ounces	grams	28.349
pounds	kilogrsms	.454
short tons	metric tons	.907
pound-feet	newton-meters	1.356
pound-inches	newton-meters	.11296

To change	*To*
ounce-Inchos	nowton-mot
centimeters	inches
motors	foot
meters	yards
kilometers	mlles
square centimeters	squnro lnch
square meters	square feot
square meters	square yard
square kilometors	square mile
square hectometers	acres
cubic meters	cubic feet
cubic meters	cubic yards
milliliters	fluid ounces
liters	pints
liters	quarts
liters	gallons
grsms	ounces
kilogrsms	pounds
motric tons	short tons

Temperature (Exact)

and General Support Maintenance Manual

AIR CONDITIONER, VERTICAL COMPACT
18,000 BTU/HR, COOLING
12,000 BTU/HR, HEATING
208 VOLT, 3 PHASE, 400 HERTZ
(HARVEY W. HOTTEL, MODEL CV-18-4-08)
4120-01-089-4054

TM 5-4120-344-14, 18 May 1982, is changed as follows:

1. Remove and insert pages as indicated below. New or changed t
indicated by a vertical bar in the margin. An illustration change
a miniature pointing hand.

Remove pages	Insert pages
----	2-9/2-10

2. Retain this sheet in front of manual for reference purposes.

Order of the Secretary of the Army:

CARL E. V
General, United
Chief of

icial:

R. L. DILWORTH
rigadier General, United States Army
The Adjutant General

STRIBUTION:
To be distributed in accordance with DA Form 12-25A, Operator's, U
diate Direct Support, and Intermediate General Support Maintenance
Air Conditioner, Vertical Compact, 18,000 BTU Cool/12,000 BTU Heat
(CV-20-4-08)

- Do not use compressed air for cleaning purposes e cept where reduced to less than 30 psi and then o with effective chip guarding and personal protect equipment.

- Dry cleaning solvent P-D-680 or P-S-661, used to clean parts is potentially dangerous to personnel and property. Avoid repeated and prolonged skin contact. Do not use near open flame or excessive heat. Flash point of solvent is 100°F (38°C).

- Use great care to avoid contact with liquid refri erant or refrigerant gas being discharged from an container under pressure. Sudden and irreversibl tissue damage can result from freezing. Wear the mal protective gloves and a face protector in any situation where skin- or eye-contact is possible. Prevent contact of refrigerant gas with flame or metal surfaces. Heat causes the refrigerant to break down and form carbonyl chloride (phosgene), highly toxic and corrosive gas.

- Escaping refrigerant gas under pressure can cause permanent tissue damage from sudden freezing.

- Polyurethane foam insulation breaks down to form toxic gases when heated to brazing temperature.

AND GENERAL SUPPORT MAINTENANCE MANUAL
AIR CONDITIONER
18,000 BTU/HR COOLING
12,000 BTU/HR HEATING
(HARVEY E. HOTTEL, MODEL CV-18-4-08)
(4120-01-089-4054)

REPORTING ERRORS AND RECOMMENDING IMPROVEMENTS

help improve this manual. If you find any mistakes or if you know o
ove the procedures, please let us know. Mail your letter, DA Fo
ended Changes to Publications and Blank Forms), or DA Form 2028-2 loc
k of this manual direct to: Commander, US Army Troop Support and A
l Readiness Command, ATTN: DRSTS-MPSD, 4300 Goodfellow Blvd., St. Lo
A reply will be furnished directly to you.

TABLE OF CONTENTS

		Page
1.	INTRODUCTION	1-1
on I.	General Information	1-1
on II.	Equipment Description	1-3
on III.	Technical Principles of Operation	1-6
2.	OPERATING INSTRUCTIONS	2-1
on I.	Description and Use of Operator's Controls and Indicators	2-1
on II.	Preventive Maintenance Checks and Services (PMCS)	2-3
on III.	Operation Under Usual Conditions	2-5
on IV.	Operation Under Unusual Conditions ...	2-8
3.	OPERATOR'S MAINTENANCE INSTRUCTIONS	3-1
on I.	Lubrication Instructions	3-1
on II.	Troubleshooting	3-1

R 4. ORGANIZATIONAL MAINTENANCE INSTRUCTIONS 4-1

ion I. Repair Parts, Special Tools, TMDE, and Support Equipment 4-1
ion II. Service Upon Receipt of Equipment 4-1
ion III. Preventive Maintenance Checks and Services (PMCS) 4-10
ion IV. Troubleshooting 4-19
ion V. Maintenance Procedures 4-21
ion VI. Preparation for Storage or Shipment .. 4-122

R 5. DIRECT SUPPORT MAINTENANCE INSTRUCTIONS 5-1

ion I. General 5-1
ion II. Troubleshooting 5-1

R 6. GENERAL SUPPORT MAINTENANCE INSTRUCTIONS 6-1

ion I. General 6-1
ion II. Maintenance Procedures..... 6-1

IX A. REFERENCES A-1
IX B. COMPONENTS of END ITEM LIST B-1
IX C. MAINTENANCE ALLOCATION CHART C-1
IX D. ADDITIONAL AUTHORIZED LIST D-1
IX E. EXPENDABLE SUPPLIES AND MATERIALS LIST E-1
IX F. MANUFACTURED ITEMS LIST F-1
RY ..... GLOSS
ETICAL INDEX ..... INDEX

Section I. GENERAL INFORMATION

PE.

manual covers Air Conditioner, Model CV-18-4-08 (figure
ufactured by Harvey W. Hottel, Inc. The air conditioner
cool or heated air for electronic equipment, and the com
ing personnel.

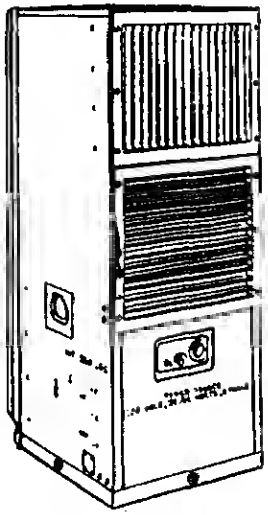


Figure I-1. Air Conditioner

NTENANCE FORMS, RECORDS, AND REPORTS.

rtment of the Army forms and procedures used for equip-
tenance will be those prescribed by TM 38-750, The Army
ce Management System (TAMMS).

TRUCTION OF ARMY MATERIEL TO PREVENT ENEMY USE.

edures for destroying Army materiel to prevent enemy use
d in TM 750-244-3.

(Quality Deficiency Report). Mail it to us at: Comma
roop Support and Aviation Materiel Readiness Command, AT
MEM, 4300 Goodfellow Boulevard, St. Louis, MO 63120. W
ou a reply.

HAND RECEIPT.

and receipts for Components of End Item (COEI), Basic Is
(BII), and Additional Authorization List (AAL) items are
in a Hand Receipt manual, TM 5-4120-344-14-HR. This ma
ned to aid in property accoutability and is available th
der, US Army Adjutant General Publication Center, ATTN:
oodson Road, St. Louis, MO 63114.

LIST OF ABBREVIATIONS.

.....
.....British Thermal Units
.....
..... Chemical, Biological, Radiologica
..... Cubic Feet Pe
..... Co
.....
..... Fa
..... Ho
.....
.....
..... Kilograms Per Square Ce
..... Kilograms Per Squa
.....
.....
..... Mi
..... Mega Neuton Pe
..... National Pip
..... Outside
..... Pounds Per Squ
.....
..... Revolutions Pe
..... Sensible He
.....
..... Volts Alternating
..... Volts Direct

c. Electric motor driven.

d. Runs continuously even under varying load conditions

e. Produces 18,000 BTU/HR of cooling.

f. Produces 12,000 BTU/HR of heat.

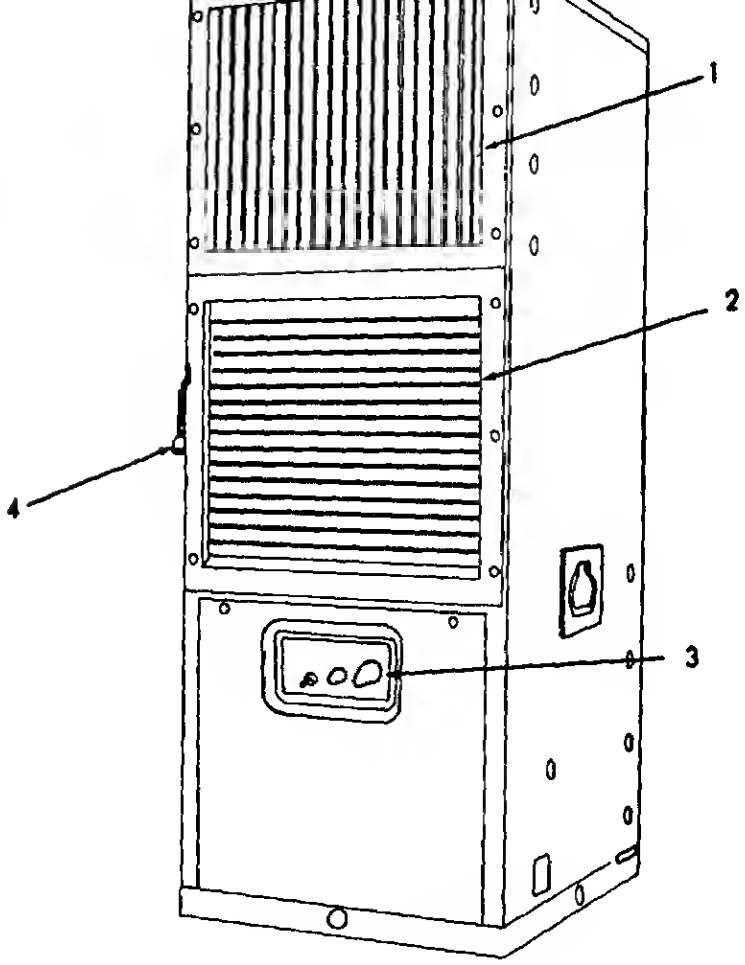
g. Contains all operating controls and parts.

h. Adaptable to remote control.

i. Adaptable to chemical and biological filters.

LOCATION AND DISCRIPTION OF MAJOR COMPONENTS.

Major components for operational purposes are shown and
gure 1-2.



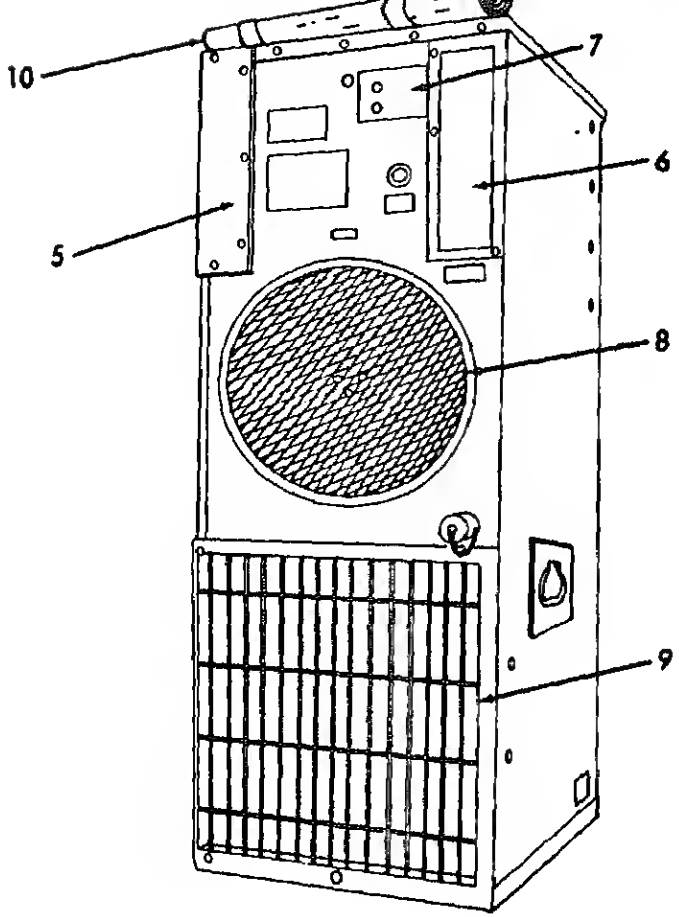
Front View

charge Grille (1). Cooled or heated air is blown out of

Air Grille Damper (2). Input air from inside is pulled
ill prior to being heated or cooled.

Panel (3). Used to select cooling or heating, temperat
, and fan speed.

ir Damper Door Control Chain (4). This chain when pulle
the air intake from inside to outside prior to heating
.



Rear View

Biological Access Cover (5). Filter is installed to t
needed.

Screen (6). Input for fresh outside air.

). High and low pressure cutout switches.

raws air through condenser coils.

oil Guard (9). Protection for condenser (located beh

(10). External protection from weather conditions
in use.

1. EQUIPMENT DATA.

ERAL

Description	Air Conditioner, Vertica
Manufacturer	Harvey W. Hottel, Inc.
Model	CV-18-4-08
National Stock Number	4120-01-089-4054

ENSIONS and WEIGHT

Length	20 in (508 mm)
Width	17 in (431.8 mm)
Height	46 in (1168.4 mm)
Weight	247 lbs (112.14 kg)

CIFICATIONS

Capacity (Cooling)	18,000 BTU/HR
Capacity (Heating)	12,000 BTU/HR
Volts	208
Hertz	400
Phase	3

Section III. TECHNICAL PRINCIPALS OF OPERATION

12. GENERAL.

The air conditioner is a self-contained, air cooled, e
tor driven unit. The unit produces 18,000 BTU/HR for coo
,000 BTU/HR for heating.

13. COOLING.

Cooling is obtained when the selector switch is turned
d the temperature control is set below room temperature.
arts the unit. A fan motor and compressor will be runnin
r is felt. If cool air is not felt move the temperature

14. VENTILATE.

Ventilation is obtained when the selector switch is tu
NTILATE. This starts the unit. A fan motor will be runn
obtained. Moving the air intake damper control increase

re control. The heat obtained is 6,000 BTU/HR.

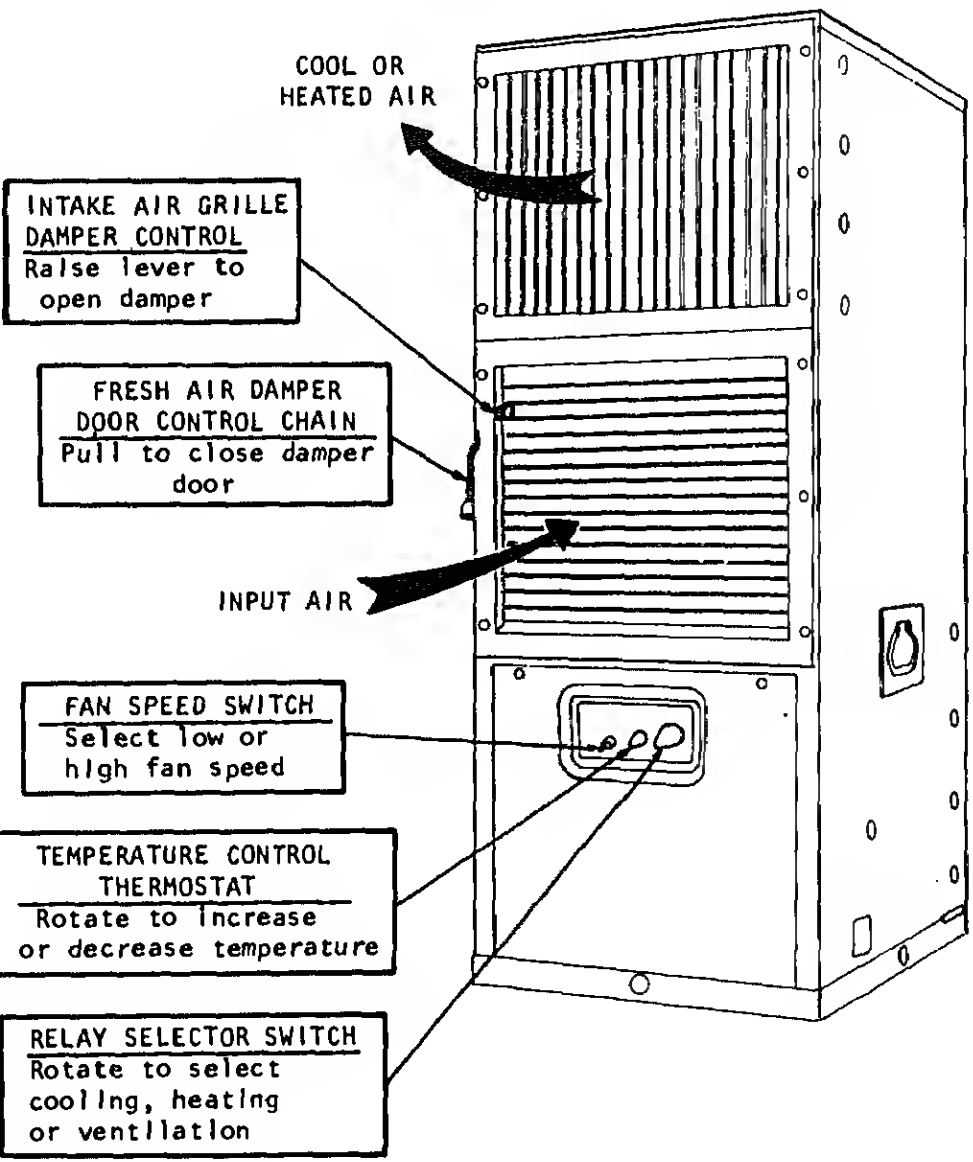
GH HEAT.

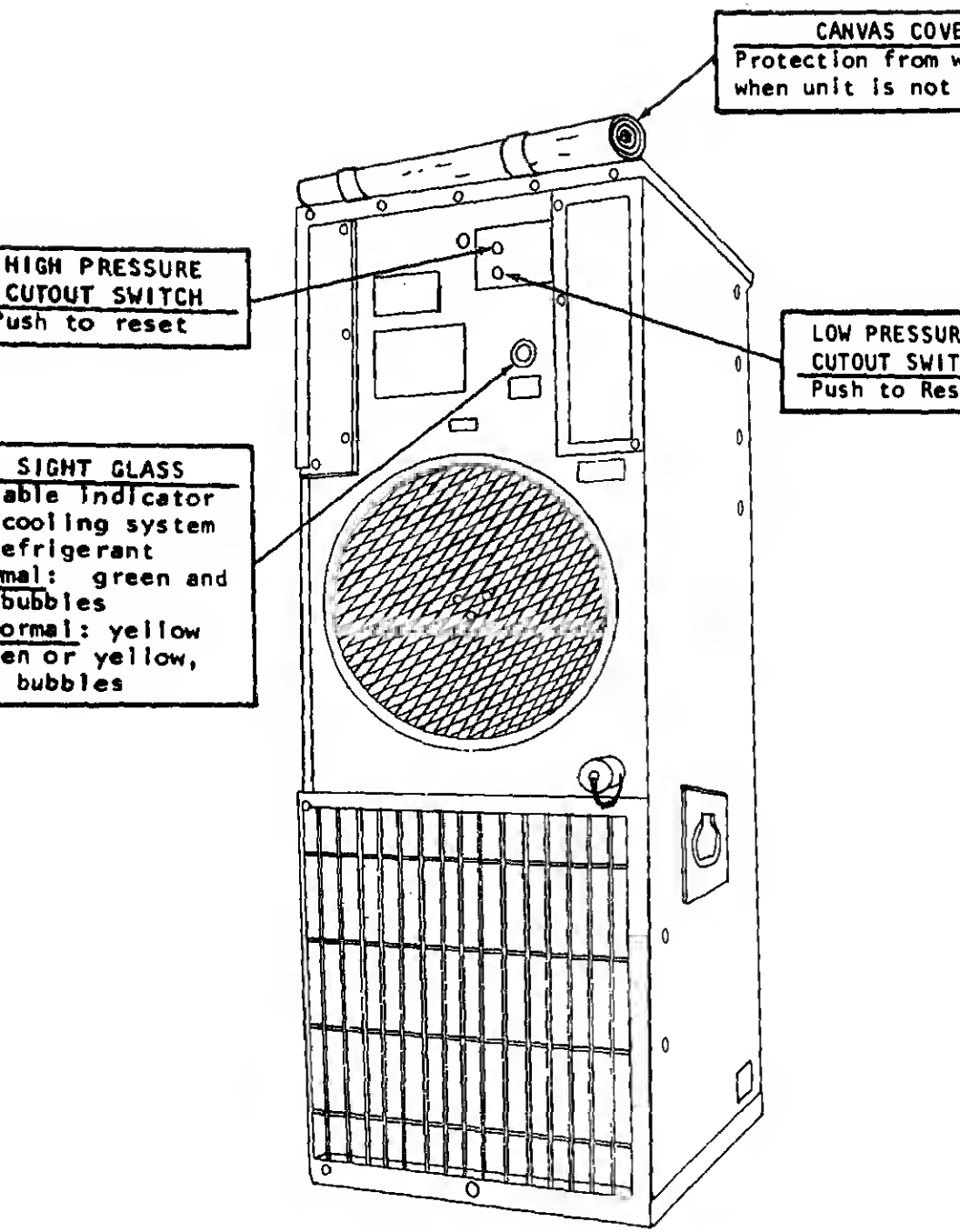
heat is obtained when the selector switch is turned
the temperature control is set above room temperatur
e unit. A fan motor will be running and heat will be
is for cold days. If heat is not felt move the tempe
The heat obtained is 12,000 BTU/HR.

I. DESCRIPTION AND USE OF OPERATOR'S CONTROLS AND IN

ERAL.

re 2-1 shows the location of the operator's controls.
te the air conditioner make sure you know the locatio
of all controls.




CANVAS COVE
Protection from w
when unit is not
HIGH PRESSURE
CUTOUT SWITCH
ush to reset
LOW PRESSUR
CUTOUT SWIT
Push to Res
SIGHT GLASS
able indicator
cooling system
efrigerant
mal: green and
bubbles
ormal: yellow
en or yellow,
bubbles

REAR VIEW

s. These checks and services help you find and fix d
ne air conditioner is damaged or fails.

Item numbers in the first column of Table 2-1 are th
which things are to be done. Column two "Interval"
do them and who should do them.

If minor defects are found when the air conditioner
e notes on what they are. Fix them or have them fixe
stopped running the air conditioner.

NOTE

While the air conditioner is running, if any defect
develops that you think will damage the air condi-
tioner, stop it at once.

Record all defects and steps taken to fix them on DA
uipment Inspection and Maintenance Work Sheet) as soo
.

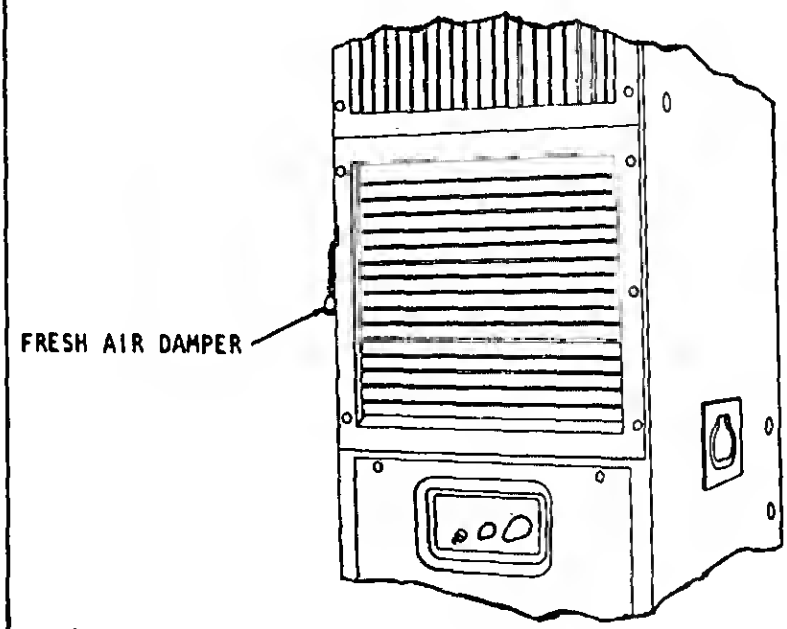
Before you operate: Always keep in mind the WARNINGS and CAUTIONS located on the inside front cover. Perform your before (B) PMCS.

NOTE

If the equipment must be kept in continuous operation, check and service only those items that can be checked and serviced without disturbing operation. Make the complete checks and services when the equipment can be shut down.

B - Before operation
D - During
A - After operation
W - Weekly

Item Number	Interval Operator Daily B	D	A	W	ITEM TO BE INSPECTED PROCEDURE Check for and have repaired or adjusted as necessary.	Equipment Ready/Av If:
1	•				CANVAS COVER .... Inspect for tears, mildew, or rot. Inspect turn-lock eyelets and fasteners for damage. If damage cannot be repaired install a new canvas cover. (See para 4-8.)	
2	•				FRESH AIR DAMPER .... Pull chain to close damper door.	



in normal weather conditions is described.

2-4. STARTING THE EQUIPMENT

Before you operate. Always keep in mind th
CAUTIONS and WARNINGS.

CAUTION

Before turning on any of the air conditione
ating controls, make sure that the fabric c
rolled up and secured, and that evaporator
and discharge grilles are fully open.

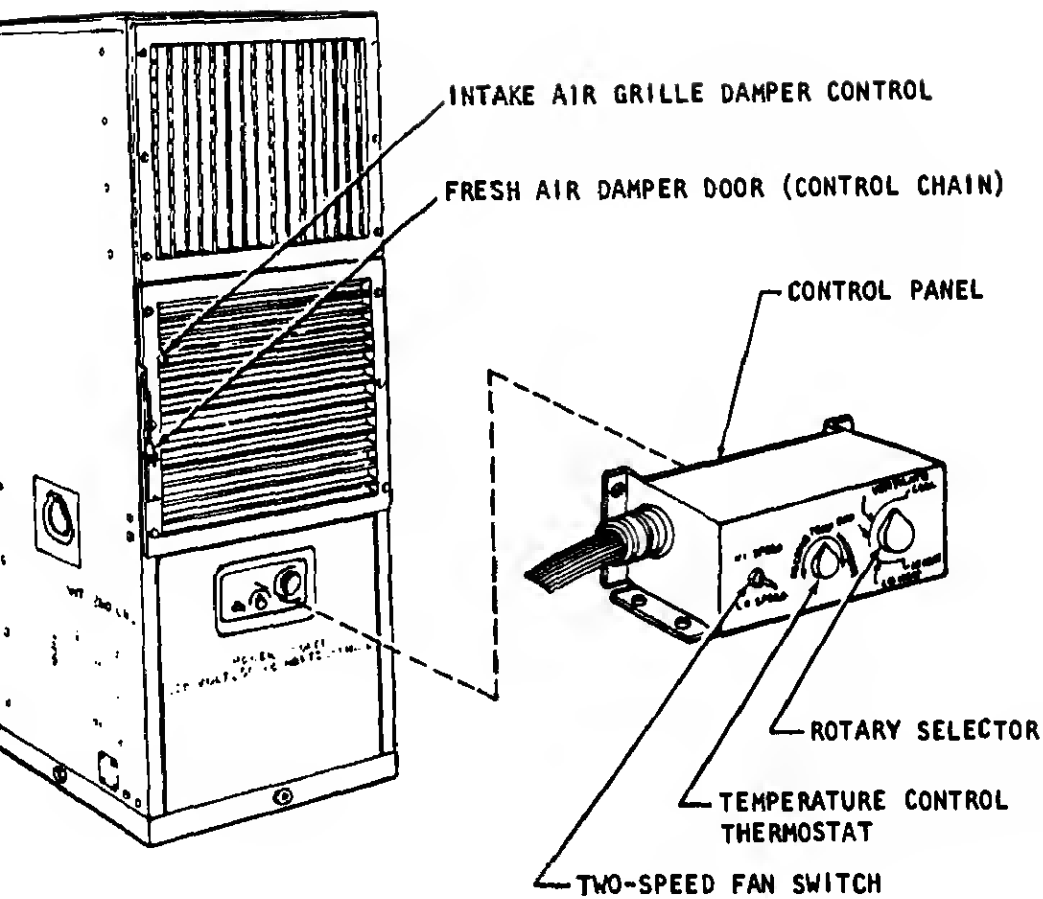
To start the air conditioner refer to figure 2-2
type of operation in table 2-2. Then make the settin

CAUTION

Do not perform the following operations unt
least four hours after power has been conne
the air conditioner if it has been stored a
freezing temperatures within the past 24 ho
knocking or pounding noises are heard when
pressor is started, shut down at once. Lea
connected to the unit, and wait an addition
hours before attempting another start.

2-5. STOPPING THE EQUIPMENT.

Place the rotary selector switch as shown in fig
OFF position.


INTAKE AIR GRILLE DAMPER CONTROL
FRESH AIR DAMPER DOOR (CONTROL CHAIN)
CONTROL PANEL
ROTARY SELECTOR
TEMPERATURE CONTROL THERMOSTAT
TWO-SPEED FAN SWITCH

ioning ed	Control Thermostat Setting	grille dampers	dampers
g - 100% recircu- air	Desired temperature	Open	Closed
g - with fresh air	Desired temperature	Partially closed*	Open
g - with fresh air drawn h CBR filter or air con- ted)	Desired temperature	Open	Closed
g - 100% recircu- air	Desired temperature	Open	Closed
g - with fresh air	Desired temperautre	Partially closed*	Open
g - with fresh air drawn h CBR filter or air con- ted)	Desired temperature	Open	Closed
ation - maximum r air	Any	Closed	Open

tial closing of the intake air grille dampers causes a greater p
tal air flow to be drawn from the outside.

To achieve maximum, cooling, heating, or ventilation, the two-s
should be set on Hi Speed.

areas, rainy or humid conditions, salt water areas, and
udes.

OPERATION IN EXTREME COLD.

The air conditioner is designed to operate in temperatur
0°F (-45°C). At extremely low temperatures, extra care
to reduce heat loss of the enclosure, by weather-stripp
and doors, insulating surfaces exposed to the outside, a
he amount of outside air drawn in through the fresh air
ir conditioner. Oo not disturb wiring during extremely
er. Wire and insulation become brittle, and are easily

OPERATION IN EXTREME HEAT.

The air conditioner is designed to operate in temperatur
20°F (49°C). At extremely high temperatures, extra care
aken to reduce the cooling load of the enclosure by check
ings such as doors and windows to be sure that they are t
ed, using window shades to shut out direct rays of the su
ting the use of electric lights and other heat producing
; and limiting the introduction of outside air through th
damper of the unit.

OPERATION IN DUSTY OR SANDY AREAS.

Sand and dust can seriously reduce the efficiency of the
oner by obstructing the air filter and reducing airflow.
air filter daily, if necessary to provide unobstructed ai
t the volume of air drawn in through the fresh air damper
ements should be made to increase the frequency of cleani
eliminator and checking drainage from the drip pan and t
e. Keep the canvas cover zipped closed when the air cond
ot in use.

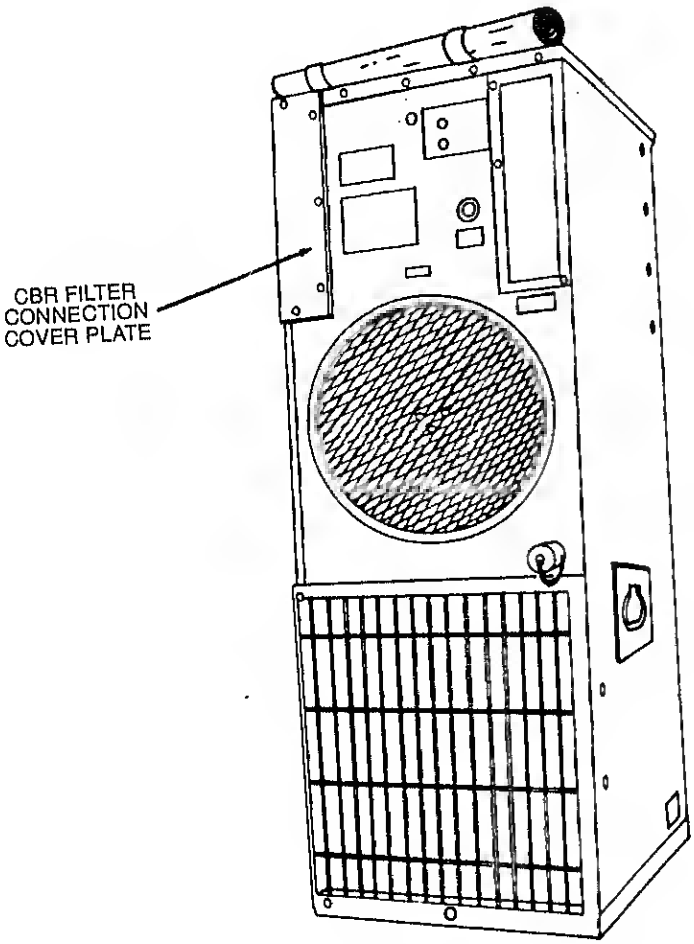
. OPERATION UNDER RAINY OR HUMID CONDITIONS.

The air conditioner is designed to be exposed to the ele
s reasonably weatherproof. However, during periods of ex
windy weather, the canvas cover should be closed when th
itioner is not in use. The canvas cover should be opened
weather conditions, to permit the interior to dry out.

. OPERATION IN SALT WATER AREAS.

To prevent the accumulation of salt on exposed surfaces
cover should be kept closed when the air conditioner is
g. Exposed areas should be spray-rinsed or sponged with
periodically to remove salt encrustations.

urce. Should it be necessary to operate in conditions requiring use of CBR
s for your shelter or facility installation.



CBR Filter Connection Location

The following are general suggestions and do not apply if they conflict with instructions for your
ation.

) The fresh air damper (door) should be closed, the opening should be covered with a suita
d air tight.

2) Fresh air damper (door) chain may be taped over to prevent damper from being opene

3) The conditioned air inlet louvers should be adjusted (partially or completely) closed in co
filter intake volume. This will cause a more positive pressure on inside of shelter or enclosure
g drawn in other than through the CBR filter.

NERAL.

air conditioner does not require lubrication.

Section II. TROUBLESHOOTING

NERAL.

table lists the common malfunctions which you may fi
ation or maintenance of the air conditioner or it's c
ld perform the tests/inspections and corrective actio
sted.

s manual cannot list all malfunctions that may occur,
inspections and corrective actions. If a malfunctio
r is not corrected by listed corrective actions, noti
or.

Table 3-I. Operator Troubleshooting

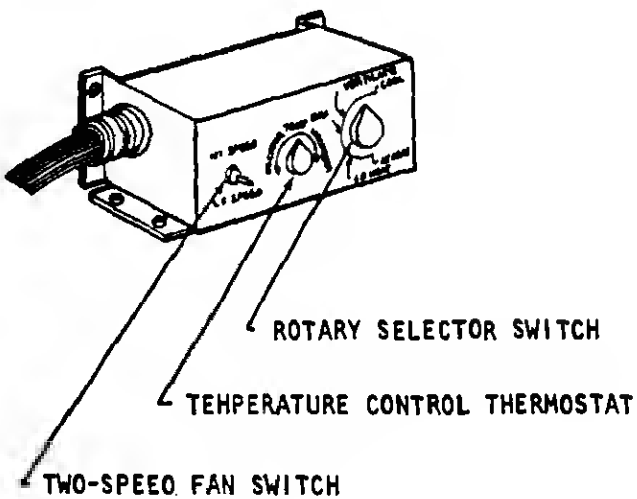
ION	T OR INSPECTION	CORRECTIVE ACTION
conditioner fails to operate (all circuits inoperativ		
er to Organizational Maintenance.		

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION

2. Insufficient or no cooling.

Step 1. Temperature Control thermostat and/or rotary switch improperly set.

Reset controls (para 2-4).



Step 2. Two-speed fan switch improperly set.

Move to Hi-Speed setting (para 2-4).

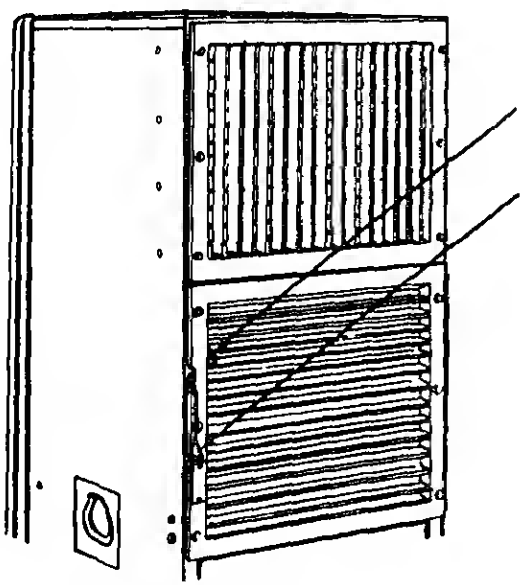
FUNCTION

TEST OR INSPECTION

CORRECTIVE ACTION

Step 3. Improperly adjusted or closed intake air g
fresh air damper door control intake.

Adjust intake air grille and fresh air damper



Step 4. Low refrigerant charge indicated by bubble
glass.

Check for abnormal condition of refrigerant in
after air conditioner has been in cooling oper
least twenty minutes. If low charge is observ
condition to Direct Support Maintenance.

NCTION

TEST OR INSPECTION

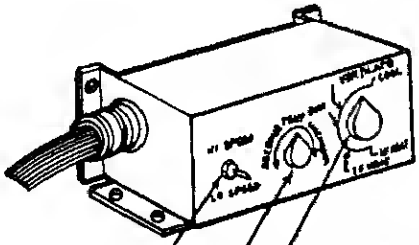
CORRECTIVE ACTION

---

nsufficient or no heating capacity.

Step 1. Temperature control thermostat and/or rotary sel switch improperly set.

Reset controls (para 2-4).

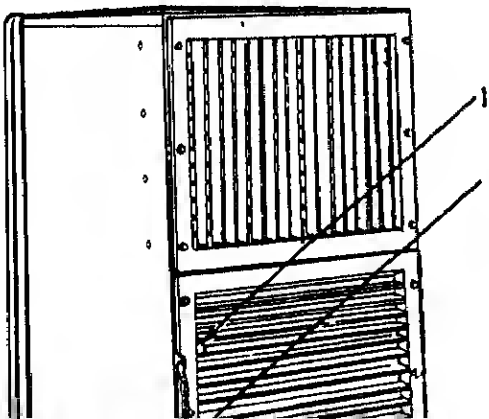


Step 2. Two-speed fan switch improperly set.

Move to Hi-Speed setting(para 2-4).

Step 3. Air movement over evaporator insufficient.

Adjust intake air grille and fresh air damper door (para 2-4).



4. Other causes.

Refer other causes to organizational and direct supp
maintenance personnel.

ERAL.

ir parts are listed and illustrated in TM 5-4120-344-
ools are required for maintenance of the equipment.
nt, and diagnostic equipment (TMDE) and support equip
equipment found in any refrigeration shop.

Section II. SERVICE UPON RECEIPT OF EQUIPMENT

ACKING.

air conditioner is bolted to the wood shipping pallet
emoved when the unit is to be installed in a permanen
roceed as follows:

t the steel strapping, and carefully remove the woode
lastic wrapping from the unit.

th the help of at least one assistant, lay the air co
her side, supported by cushioned support blocks.

move four bolts securing the shipping pallet to the a
s base plate.

turn the unit to the upright position.

CKING UNPACKED EQUIPMENT.

k the air conditioner in accordance with the followin
ons:

spect the equipment for damage incurred during shipme
ment has been damaged, report the damage on DD Form 6
rovement Report.

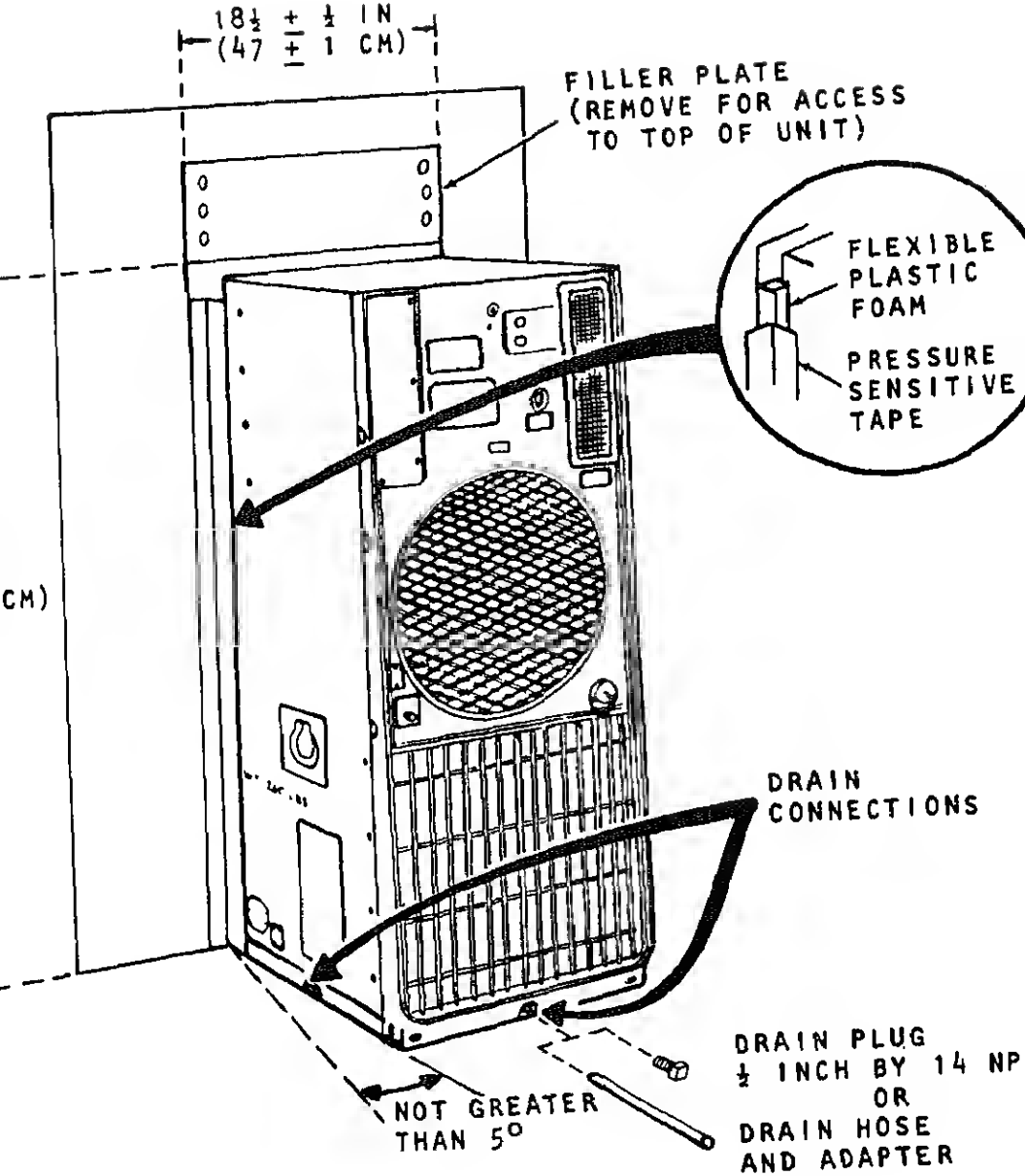
eck the equipment against the packing slip to see if
is complete. Report all discrepancies in accordance
on of TM 38-750.

uld be installed (figure 4-1) on a level supporting
niform condensate drainage. If a level surface is
: unit may be mounted on an angle not greater that
rizontal. If this type of mounting is unavoidable
the condensate drain to the drain opening in the
base plate. Drain plugs are located in the middle
e base plate. Standard 1/2 inch by 14 NPT fittings
n place of one or more of these plugs to conduct
o an acceptable drainage area. A standard garden
or this purpose.

mensions. An opening 18-1/2 + 1/2 inches (47 +
+ 1/2 inches (124.5 + 1 cm) high is required
f the air conditioner. A removable filler plate
d above the unit to permit ready removal of the top
g.

The air conditioner should be bolted to the mount-
base plate contains four mounting holes for this
figure 4-2 for base mounting plan.

ditioner must have an unobstructed flow of air in
fficiently. This minimizes the cooling load on th
em.


18½ ± ½ IN
(47 ± 1 CM)
FILLER PLATE
(REMOVE FOR ACCESS
TO TOP OF UNIT)
FLEXIBLE
PLASTIC
FOAM
PRESSURE
SENSITIVE
TAPE
CM)
DRAIN
CONNECTIONS
DRAIN PLUG
½ INCH BY 14 NP
OR
DRAIN HOSE
AND ADAPTER
NOT GREATER
THAN 5°

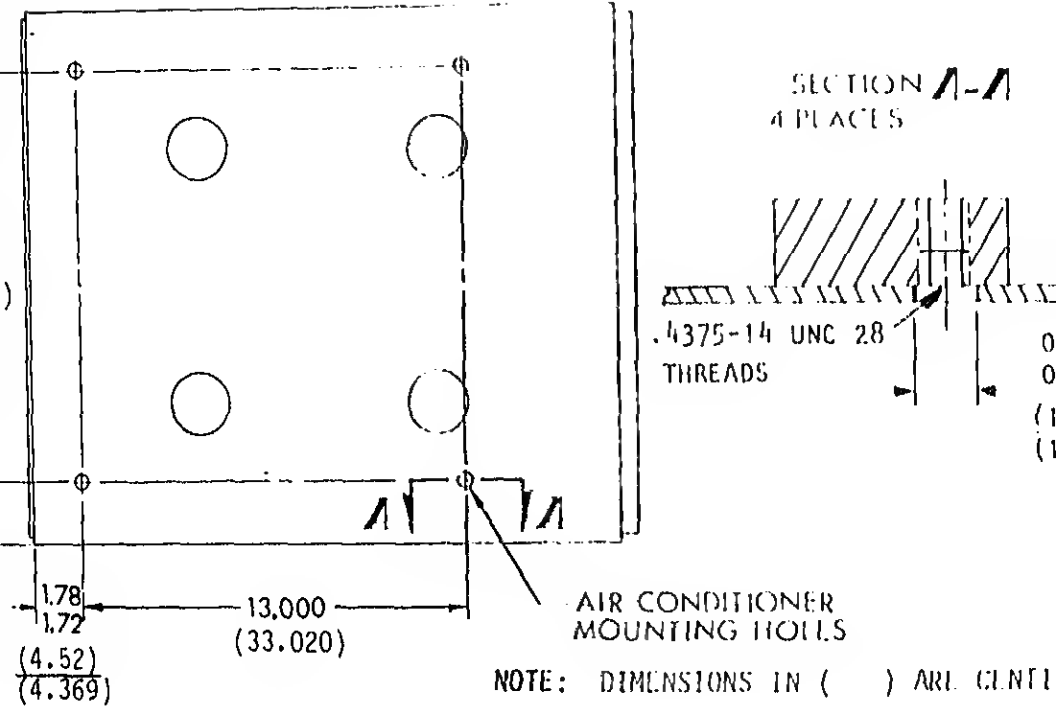


Figure 4-2. Base Plan

POWER SOURCE.

e air conditioner operates on 208 volts, 3-phase, 400 He
The power input receptacle (figure 4-3) is located at t
unit above the condenser coil inlet. Alternate location
cal power connections are provided at both sides of the
ation may be used by interchanging the receptacle at the
unit and one of the cover plates at each side of the uni
e unused receptacle locations are covered to prevent air
rawn through the opening. To move the power receptacle
te location proceed as follows:

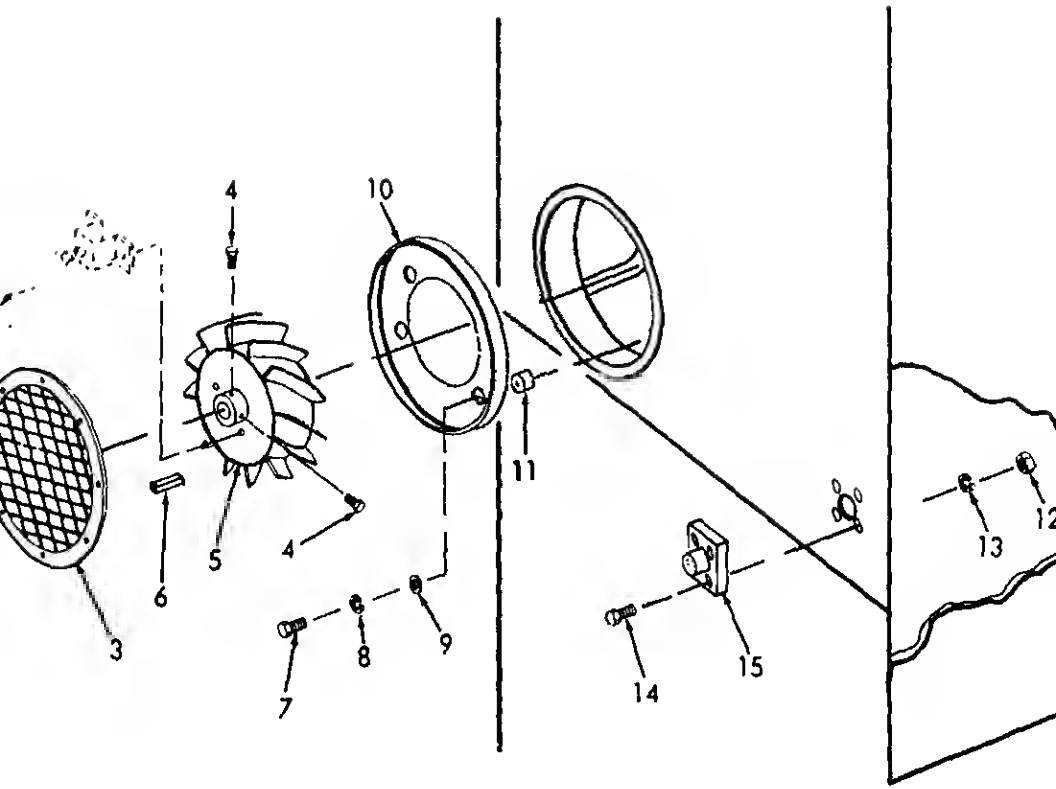


Figure 4-3. Power Receptacle Relocation (Sheet 1 of 2).

) Remove screws (1) and lockwashers (2) securing conden guard (3) to housing.

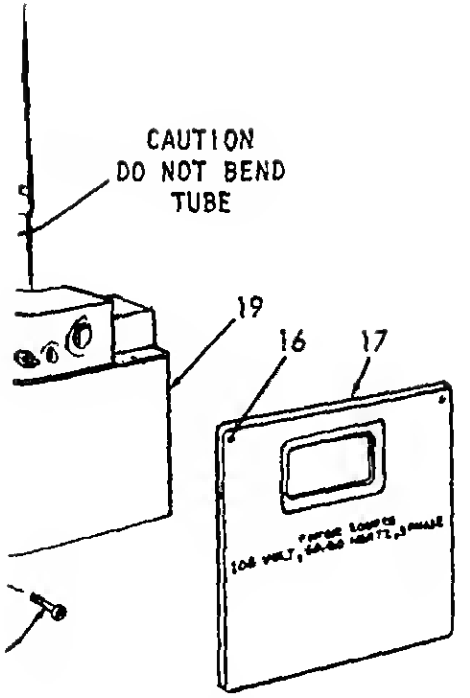
) Remove condenser fan guard.

) Remove set screws (4).

) Using a wheel puller install two 1/4 inch bolts. Scr bolts evenly.

) Remove condenser fan (5) and key (6).

) Remove screws (7), lockwashers (8), washers (9), that baffle (10) and bushings (11).



:location (Sheet 2 of 2).

16).

s (18) that attach junction
ion box as needed for access

:ontrol panel.

the alternate power locatio
r left sides of the case.

2), and screw (23), remove

(1) Install plate (21) using screws (22), nuts (24)
(23), to the access hole where the connector (15
removed.

(2) Install connector (15) using screws (13) washers
nuts (12).

(3) Replace junction box (19).

CAUTION

DO NOT BEND TUBE

(4) Tighten turn-button fasteners(18).

(5) Reinstall lower panel (17), tighten turn-button
(16).

(6) Install baffle (10) and bushings (11) using scre
washers (9) and lockwashers (8).

CAUTION

Do not hammer the impeller onto the motor s
The motor bearings would be damaged. If di
is encountered, dress out rough spots on th
with a fine file, stone or abrasive cloth.
coating of light oil to ease assembly.

Align keyways in shaft and impeller, install key
press impeller (5) onto shaft. The end of the
should be even with the face of the hub when the
completely in position. Tighten setscrews (4)
Starting with the keyway setscrew, tighten to a
of 78-82 pound-inches (8.87-9.33 newton-meters)

NOTE

In order to direct the condenser exhaust up
away from the intake, the condenser fan gua
designed so that it can be installed in on
way. All screw holes must match to permit
installation.

(8) Install condenser fan guard (3) with screws (1)

(5) Remove screw (8) securing thermostat tube bulb (
(10). Route bulb and tube through grommet (11).

(6) Loosen four turn-button fasteners (12) that atta
ion box (13) to air conditioner.

CAUTION

When performing the following procedures. Do not bend bulb or tube (9).

(7) Carefully remove the junction box (13) from the
tioner.

(8) Remove four turn-button fasteners (14) that atta
ol panel (15) and gasket (16) to junction box (13).

(9) Disconnect electrical connector (17) and remove cont
(15).

(10) Carefully coil thermostat tube and bulb on control
in figure 4-4 and install cable clamp (10) and screw (8)

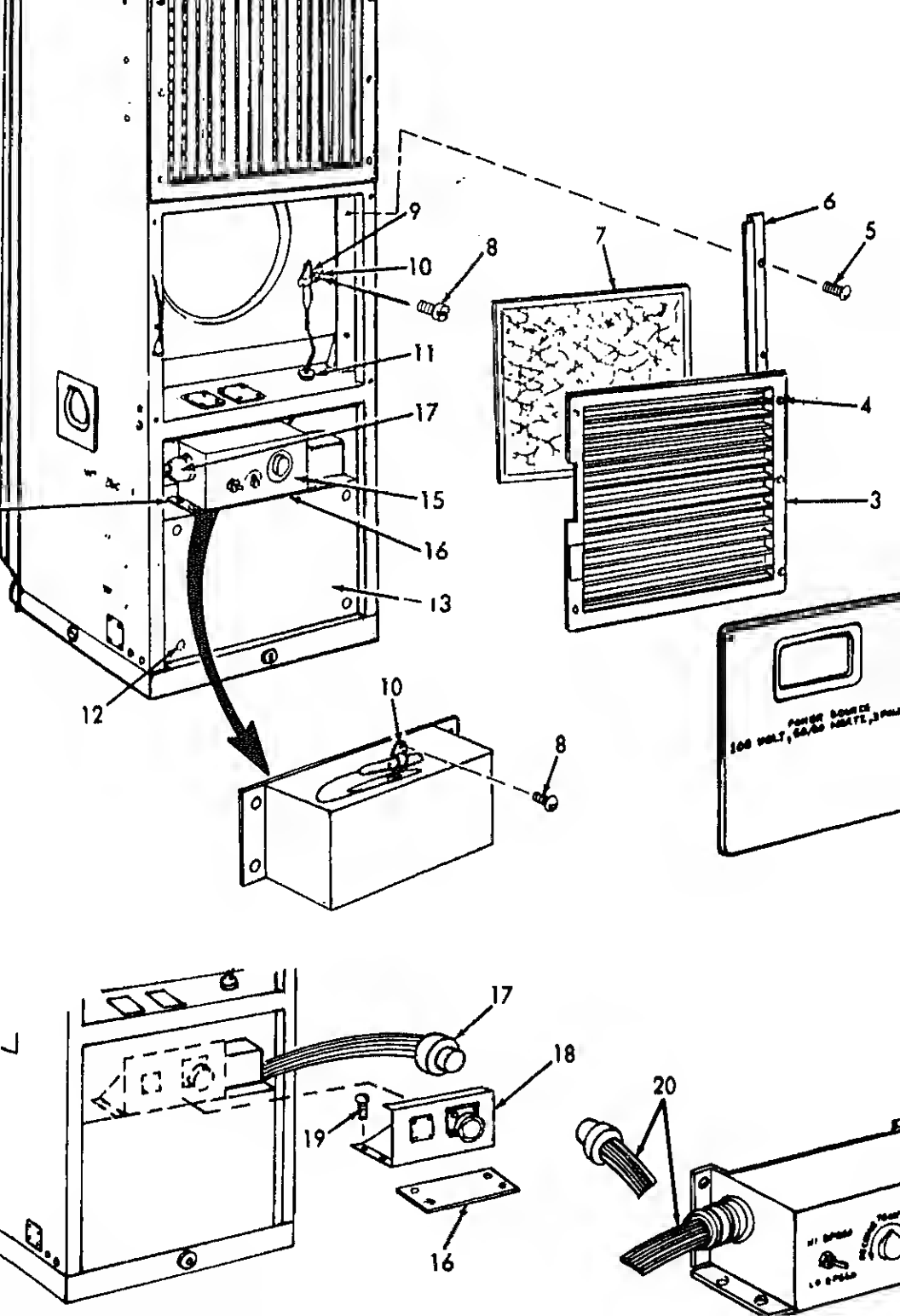
(11) Attach electrical connector (17) to block off assem

(12) Install block-off assembly (18), using gasket (16)
s (19) to junction box(13).

NOTE

Replace gasket if damaged or defective.

(13) Reinstall junction box (13), and tighten turn-butto
ners (12).


9
10
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16
13
12
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5
7
4
3
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18
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16
20

Section III. PREVENTATIVE MAINTENANCE CHECKS AND SER

GENERAL.

a. Preventative Maintenance Checks and Services (PMCS,
are to be done at the Organizational Maintenance level
the air conditioner is ready to use at all times. Thes
services help you find and fix defects before the air co
damaged or fails.

b. Item numbers in the first column of Table 4-1 are t
er in which things are to be done. Column two "Interval"
to do them and who should do them.

c. If minor defects are found when the air conditioner
take notes on what they are. Fix them or have them fix
have stopped running the air conditioner.

NOTE

While the air conditioner is running, if any defec
develops that you think will damage the air condi-
tioner, stop it at once.

d. Record all defects and steps taken to fix them on D
(Equipment Inspection and Maintenance Work Sheet) as so
ible.

Before you operate: Always keep in mind the WARNINGS located on the inside front cover.

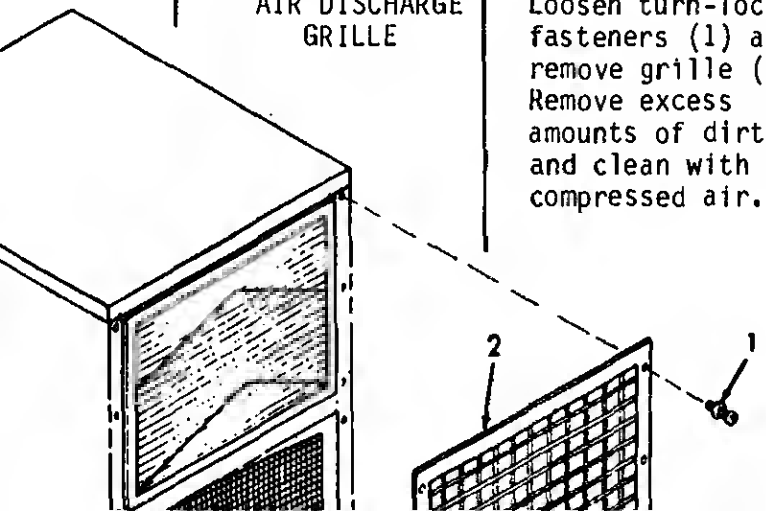
NOTE

the equipment must be kept in continuous operation, check
service only those items that can be checked and serviced
hout disturbing operation. Make the complete checks and
vices when the equipment can be shut down.

an item in a longer interval chart requires more frequent
cking and servicing when the equipment is used in an un-
al environment, the special intervals shall be indicated
an asterisk or similar indicator before the sequence number,
a letter after the sequence number. Footnotes explain
cial intervals.

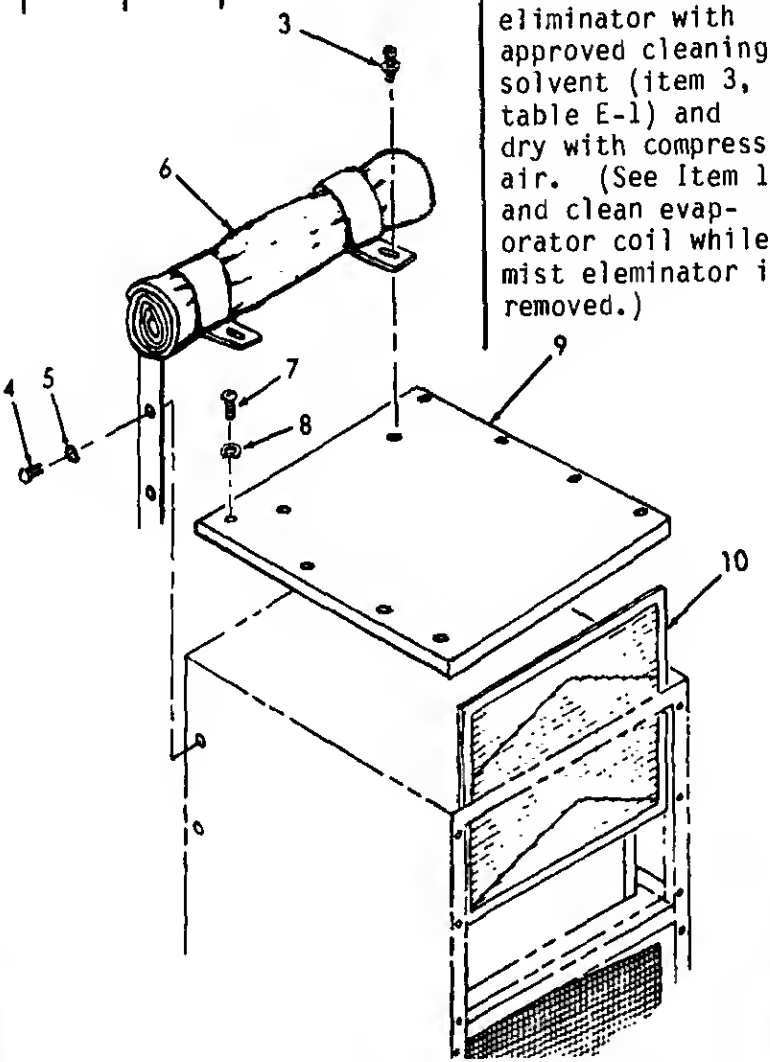
Weekly M - Monthly Q - Quarterly

rval		ITEM TO BE INSPECTED	PROCEDURE	Equipment i Not Ready/ Available I
M	Q			
		WARNING		
		ry cleaning solvent (Fed. Spec P-D-680) (item 3, able E-1) used to clean parts is potentially angerous to personnel and property. Do not use ear open flame or excessive heat. Flash point f solvent is 100°F (38°C).		
		AIR DISCHARGE GRILLE	Loosen turn-lock fasteners (1) and remove grille (2). Remove excess amounts of dirt and clean with dry compressed air.	



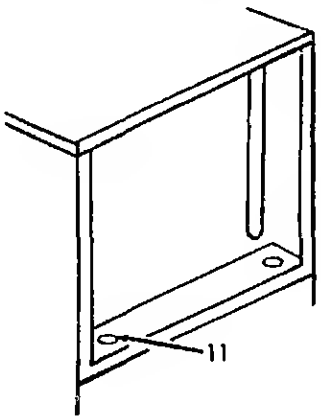
MIST ELIMINATOR

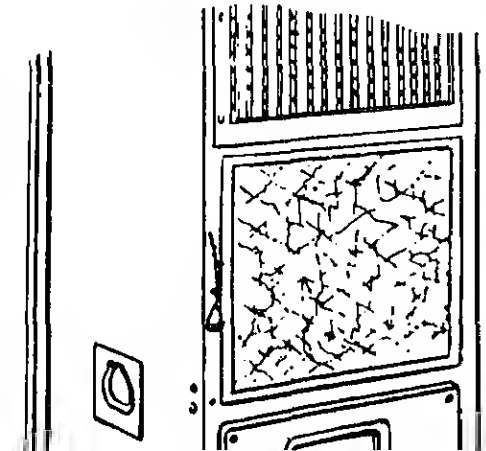
(3). Remove screws (4), washers (5), and remove canvas cover assembly (6). Remove screws (7), washers (8) and top cover (9). Lift mist eliminator (10) and remove. Clean mist eliminator with approved cleaning solvent (item 3, table E-1) and dry with compressed air. (See Item 13 and clean evaporator coil while mist eleminator is removed.)

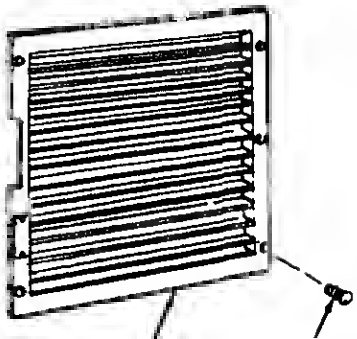


Weekly M - Monthly Q - Quarterly

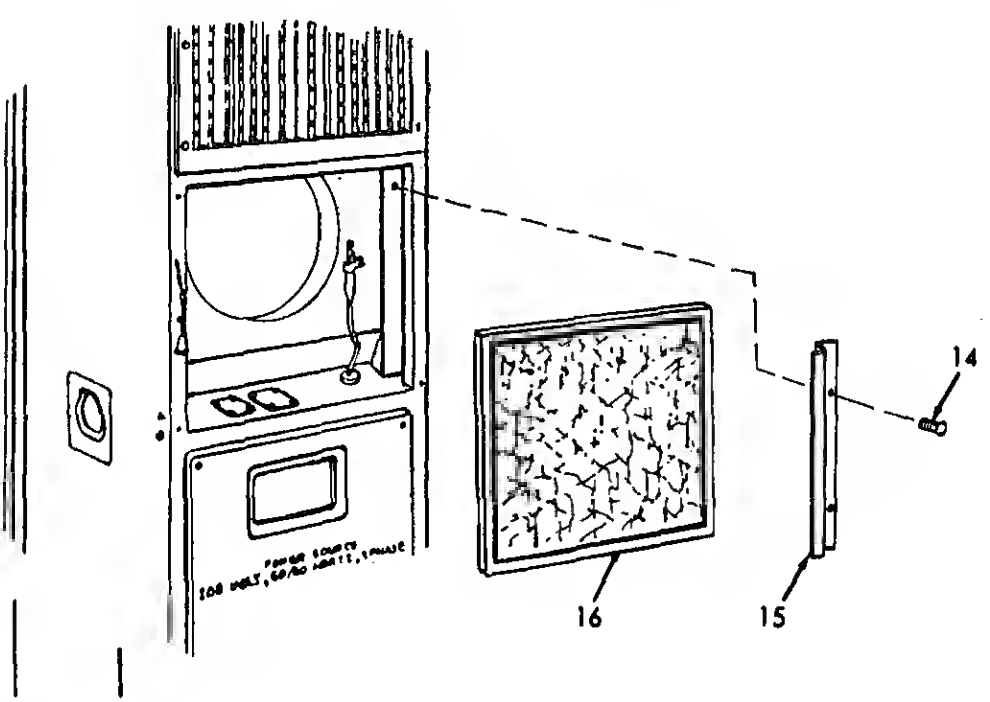
Interval M	Interval Q	ITEM TO BE INSPECTED	PROCEDURE	Equipment Not Ready Available
	•	DRIP PAN ASSEMBLY	With the mist eliminator removed, clean the drip pan assembly (11). Inspect drain holes and remove accumulated dirt. Reinstall mist eliminator with drain holes at the bottom. Reinstall top cover, canvas cover and air discharge grille in reverse order of removal.	
		AIR INTAKE GRILLE	Loosen turn-lock fasteners (12) and remove grille (13). Remove excess dirt and clean with dry compressed air.	





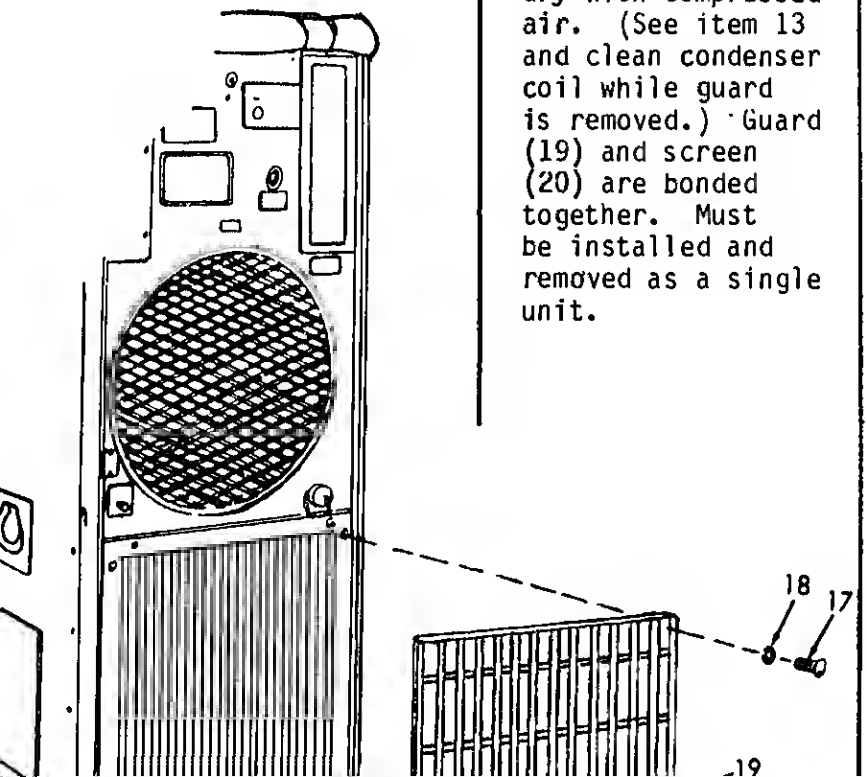


	AIR FILTER	Remove screws (14), and filter retainer (15). Remove air filter (16). Clean with cleaning solvent (item 3, table E-1) and dry with compressed air. Dip or spray filter with filter - kote (item 5, table E-1) or oil, grade 20, 30, or better (item 9, table E-1). Reinstall air filter and air intake grille in reverse order of removal.

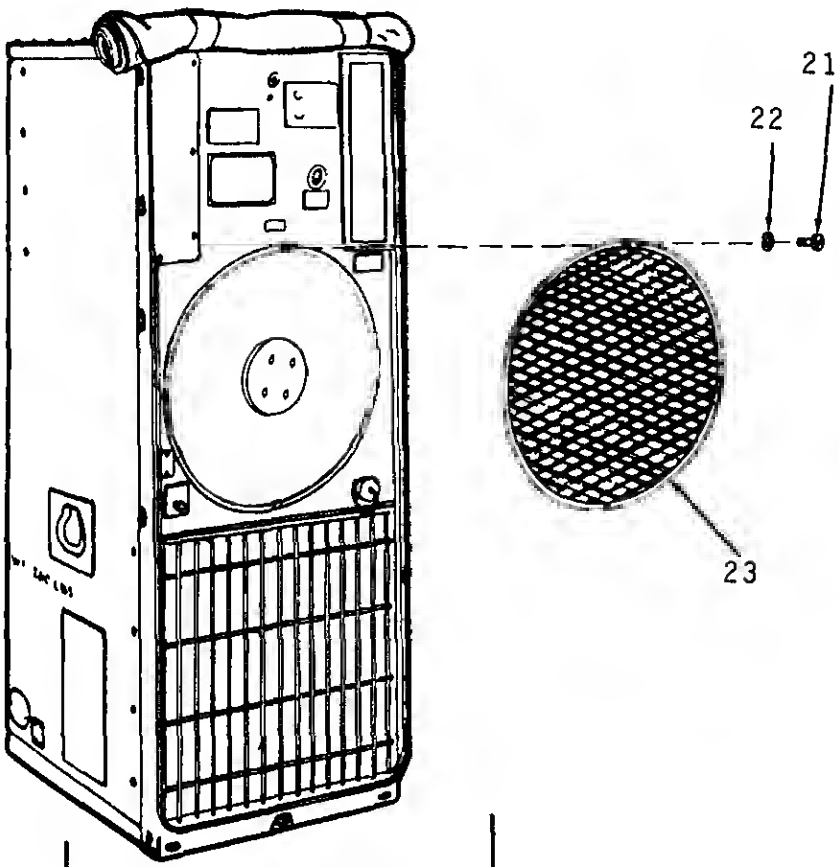


ly M - Monthly Q - Quarterly

val Q	ITEM TO BE INSPECTED	PROCEDURE	Equipment I: Not Ready/ Available I
	REAR CONDENSER COIL GUARD	Remove screws (17), washers (18), and remove guard (19). Screen (20) is now accessible. Clean guard to remove excess dirt with a brush. Clean screen with cleaning solvent (item 3, table E-1) and dry with compressed air. (See item 13 and clean condenser coil while guard is removed.) Guard (19) and screen (20) are bonded together. Must be installed and removed as a single unit.	



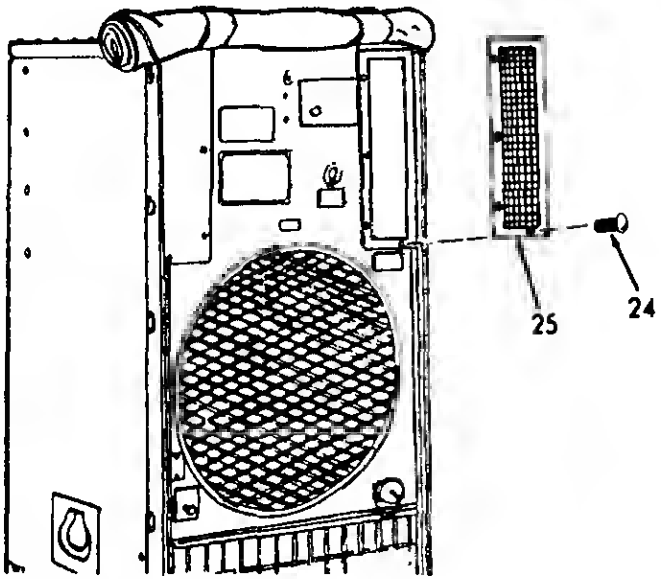
solvent (item 3, table E-1) and dry with compressed air. Reinstall after cleaning.

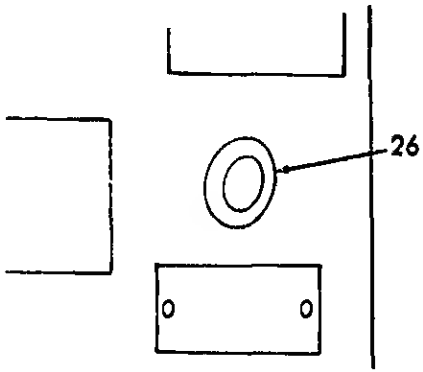


(Cont'd)

W - Weekly M - Monthly Q - Quarterly

Interval		ITEM TO BE INSPECTED	PROCEDURE	Equipme Not Rea Availab
M	Q			
		FRESH AIR SCREEN	Remove screws (24) that attach screen (25) to case. Clean with cleaning solvent (item 3, table E-1) and dry with compressed air. Reinstall after cleaning.	



•	SIGHT GLASS	Inspect sight glass (26) for bubbles and color condition. If bubbles are observed after 20 minutes of cooling operation, the refrigerant charge is low. If a green-yellow or yellow color is seen after one hour of operation, the refrigerant system may contain moisture. Report either condition to Direct Support Maintenance.
		
•	CONTROLS	Check for proper operation.
•	FAN	Check for unusual noise or vibration.
•	WIRING	Check for worn or frayed insulation.
•	EVAPORATOR AND CONDENSER	Clean coils with a brush and low pressure compressed air.

2 lists the common malfunctions which you may find duri
or maintenance of the air conditioner or it's componen
rform the tests/inspections and corrective actions in t

ual cannot list all malfunctions that may occur, nor
inspections and corrective actions. If a malfunction i
is not corrected by listed corrective actions, notify
or.

4-2. Organizational Maintenance Troubleshooting

INSPECTION	
RECTIVE ACTION	
COMPRESSOR	
r will not start.	
Check circuit breaker for tripped condition.	
et circuit breaker. If compressor fails to start, test cuit breaker (para 4-30).	
Check high and low pressure cut out switches for tripp condition. Reset pressure switches.	
r replacement refer to direct support maintenance.	
Test fuses (para 4-29).	
Test circuit breaker for defective condition (para 4-3	
Test for an open-circuit condition in the control circuit by means of a continuity check.	
lace component or wire causing open circuit (para 4-24 8).	

Compressor starts but immediately stops.

Step 1. Repeat test or inspections in steps 1 and 2 a
compressor starts and immediately stops agai
condition to Direct Support Maintenance.

HEATING

Little or no heating capacity.

Step 1. Check for loose electrical connections or fau

Repair or replace wiring as necessary (para 4-45).

Step 2. Test rotary selector switch and temperature c
thermostat for faulty wiring.

Replace defective switch (para 4-25 and 4-26).

Step 3. Test heater relay for faulty contact closure.

Replace defective relay (para 4-31).

Step 4. Test for defective operation of heater high t
cutout.

Replace defective thermostatic switch (para 4-43.

Step 5. Test heater for open-circuited element.

Replace defective heaters (para 4-43.1).

COOLING

ent cooling.

Observe sight-glass for low refrigerant charge (Table 4-1, Item 9).

low refrigerant charge is observed, refer to direct pport maintenance.

Check for indications of defective solenoid valve operation.

ace defective solenoid valve coil (para 4-42.2). If lenoid valve is defective, refer to direct support intenance.

Section V.

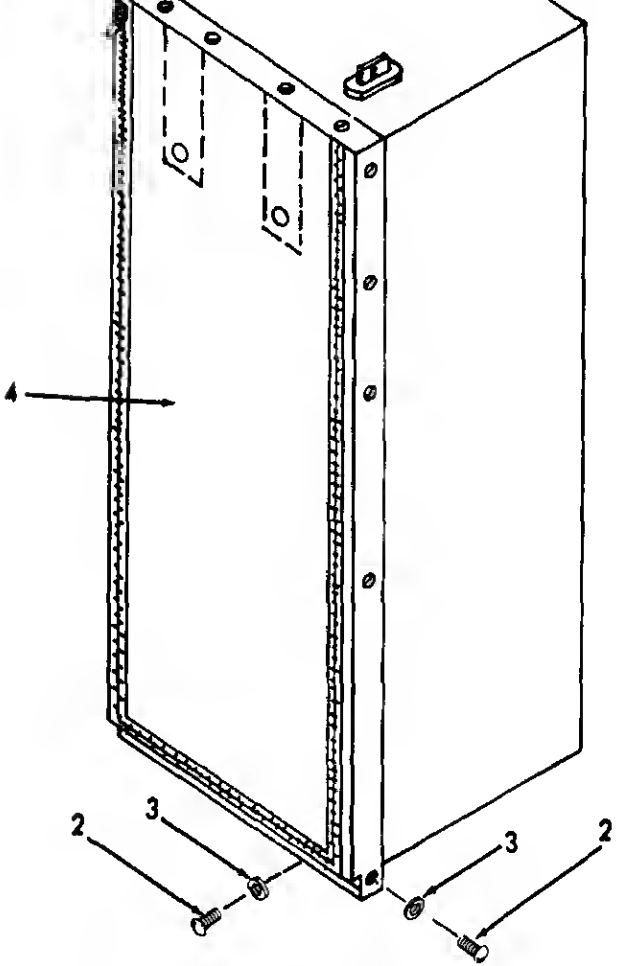
MAINTENANCE PROCEDURES

edures in this section have been arranged in the order ns appear in the organizational (O) maintenance level Maintenance Allocation Chart (MAC) which is provided i Step-by-step-procedures have been provided for all acti be performed by organizational maintenance in the orde appear on the MAC. Actions authorized to be performed general support maintenance have been duly noted; procedures for these actions may be found in Chapters 5 ively.

COVER.

on.

as cover is made of vinyl impregnated nylon cloth. Sma are sewn into the hems on the edges of the cover that e cabinet to give it shape. The back flap of the cover position when closed by means of zippers at the sides Two straps with eyelets in the ends are sewn into the t



Removal.

(1) Turn turn-lock fasteners (1) and roll canvas
Zip the canvas cover closed.

(2) Remove 18 screws (2) and washers (3) that at
cover (4) to the outer case.

(3) Remove cover (4).

Inspection.

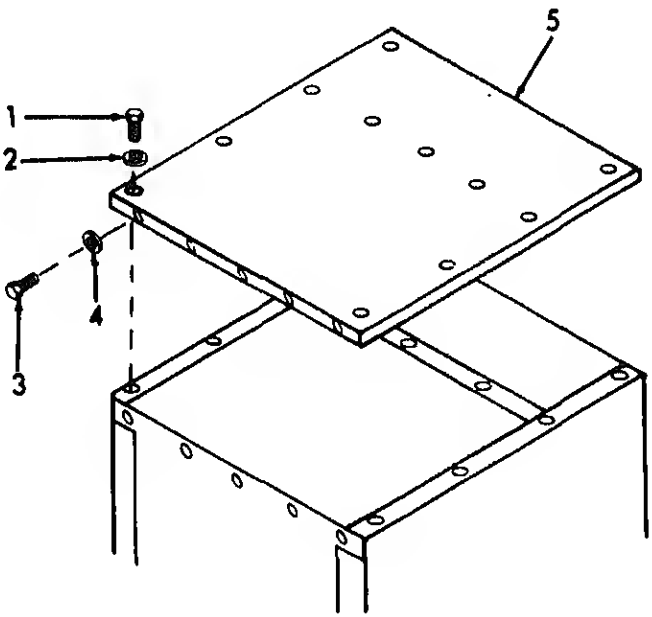
Inspect canvas cover for damage. Replace if

on.

panel is an assembly that encloses the top of the air
abinet. Gasket strips are glued to the bottom of the
form a seal. Insulation material is glued to the botto
nel to minimize heat gain/loss and sound transmission.

ry Procedure.

anvas cover (para 4-8).



Remove screws (1), and preformed packing (2).

Remove screws (3), and washers (4).

Remove top panel assembly (5).

n and Replacement.

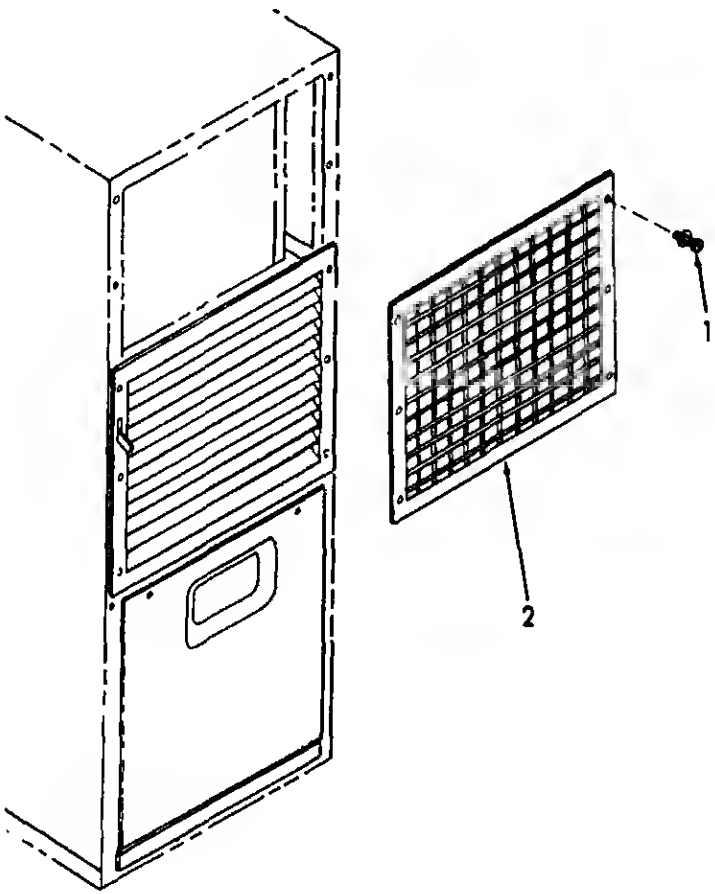
Inspect for loose or damaged gaskets.

Replace damaged gasket material and secure gaskets wit
adhesive (Item 2, table E-1).

AIR DISCHARGE GRILLE.

cription.

e grille is equipped with two sets of independently mount
The horizontal blades can be positioned to direct the
or downward. The vertical blades can be positioned to d
to one or both sides of the center.



noval.

(1) Twist turnbutton fasteners (1).

(2) Remove air discharge grille (2).

cleaning solvent, P-D-680 (item 3, table E-1),
to clean parts is potentially dangerous to
onnel and property. Avoid repeated and pro-
ed skin contact. Do not use near open flame or
ssive heat. Flash point of solvent is 100°F
C).

Brush off loose dirt or foreign matter.

Wipe louvers with a cloth dampened with dry cleaning
solvent, (item 3, table E-1).

and Repair.

Inspect for bent or broken louver blades.

Straighten bent louver blades with standard pliers.

Inspect for loose or damaged gaskets.

Replace damaged gasket material and secure gaskets with
adhesive (item 2, table E-1).

Maintenance procedure for replacing screw turnlock.

on.

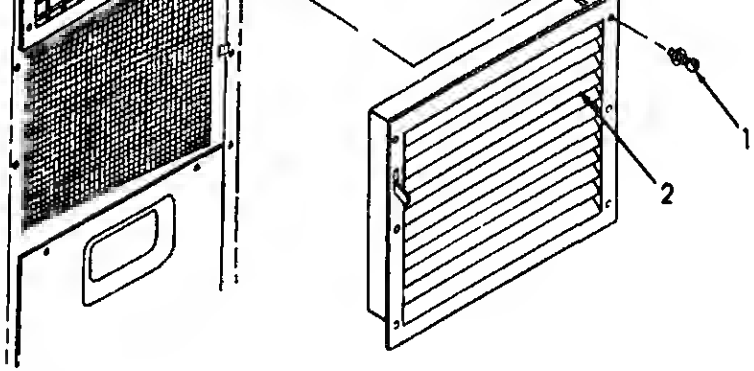
Align holes in air discharge grille with holes in
housing.

Attach air discharge grille (2) with turnbutton
fasteners (1).

AKE GRILLE.

n.

e is equipped with blades which are connected by
age so that all blades open or close together. This
to control the volume of air passing through the grill
ol, in turn, the volume of air drawn in through the
en when the damper is open.



oval.

(1) Twist turnbutton fasteners (1).

(2) Remove air intake grille (2) from housing.

vice.

WARNING

Dry cleaning solvent P-D-680 (item 3, table E-1), used to clean parts is potentially dangerous to personnel and property. Avoid repeated and prolonged skin contact. Oo not use near open flame or excessive heat. Flash point of solvent is 100°F (38°C).

(1) Brush off loose dirt or foreign matter.

(2) Wipe louvers with a cloth moistened with dry clea solvent, (item 3, table E-1).

spection and Repair.

(1) Inspect for bent or broken louver blades.

(2) Straighten bent louver blades with standard plier

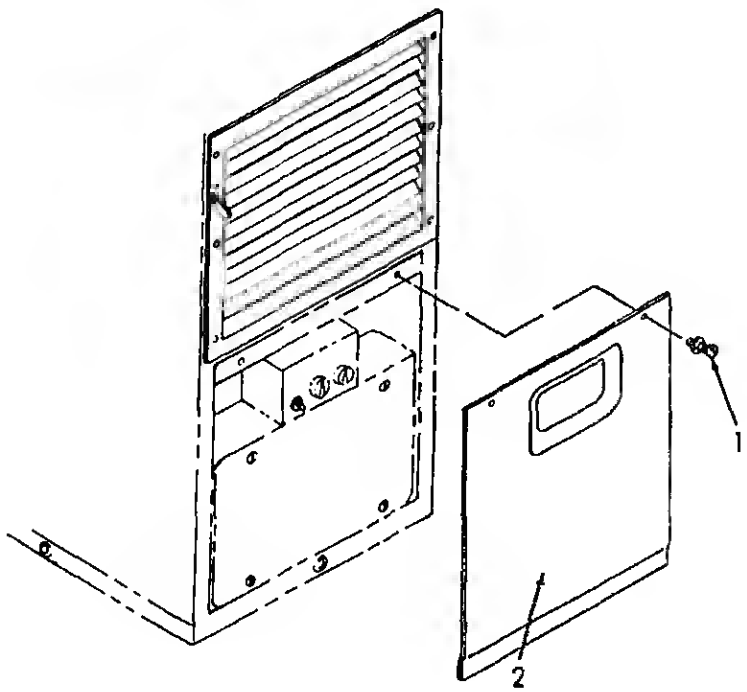
(3) Inspect for loose or damaged gaskets.

Secure air intake grille (2) with turnbutton fasteners (1).

PANEL.

on.

r panel encloses and seals the lower front area of the er. It contains a depressed cutout opening to provide control panel. The opening is sealed with an RFI- ket. The wiring diagram is located on the back side of



Loosen panel fasteners (1).

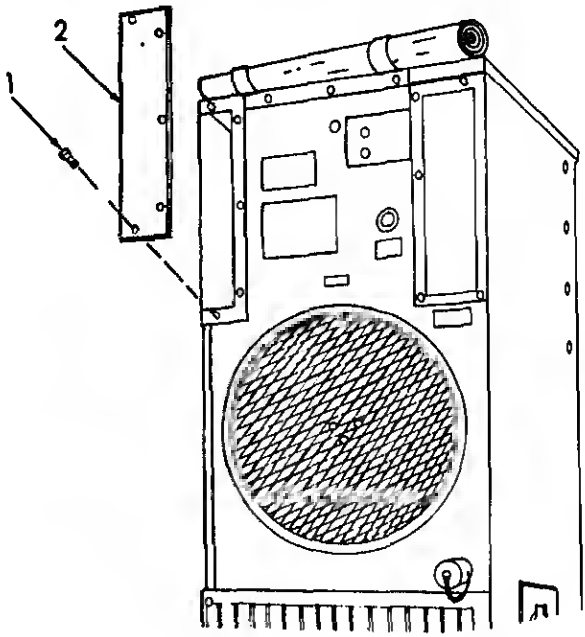
Remove lower panel (2).

on and Repair.

Inspect for loose or damaged gaskets.

Replace damaged gasket material and secure gaskets wit adhesive (Item 2, table E-1).

the opening is closed by a sheet metal cover.



b. Preliminary Requirements.

Remove canvas cover (para 4-8).

c. Removal.

(1) Remove screws (1) that attach CBR cover

(2) Remove cover.

d. Installation.

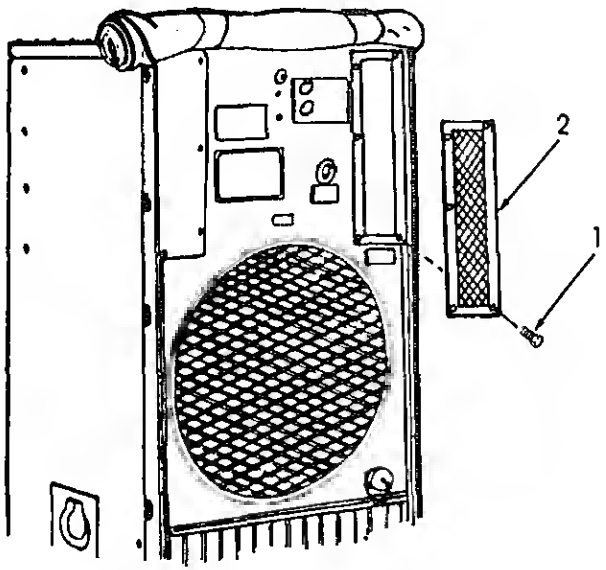
(1) Align holes in CBR cover with holes in

(2) Install cover (2) using screws (1).

(3) Install canvas cover (para 4-8),

iption.

fresh air screen is mounted on the upper right corner o
ace of tne air conditioner. It encloses the two refrig
ice valves, and prevents leaves and other debris from e
air intake opening.



minary Requirements.

ve canvas cover, (para 4-8).

al.

(1) Remove screws (1) securing fresh air screen (2) to

(2) Remove fresh air screen.

ction and Service.

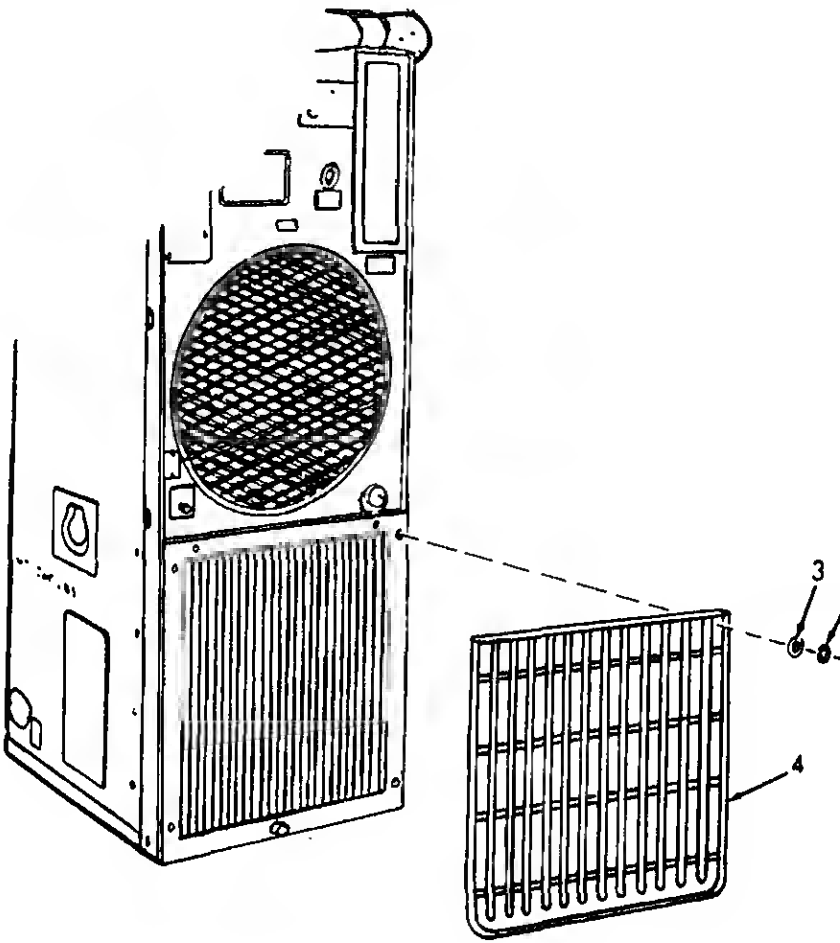
WARNING

Dry cleaning solvent, P-D-680 (item 3, table E-1), used to clean parts is potentially dangerous to personnel and property. Avoid repeated and prolonged skin contact. Do not use near open flame or

-15. CONDENSER COIL GUARD.

. Description.

The condenser coil guard occupies the bottom one-thir
ear surface of the air conditioner. It is aluminum fabri
onsisting of a grid of 3/16-inch aluminum rods in a frame
ngle. The face of the guard is covered with 16-mesh alum
loth to prevent the entry of leaves and other small debri
uard is secured to the casing of the air conditioner with
ashers.



) Remove screws (1), lock-washers (2) and flat washers securing condenser coil guard (4) to housing.

) Remove condenser coil guard.

and Inspection.

WARNING

ry cleaning solvent, P-D-680, (item 3, table E-1), sed to clean parts is potentially dangerous to ersonnel and property. Avoid repeated and pro- onged skin contact. Do not use near open flame r excessive heat. Flash point of solvent is 100°F 38°C).

) Brush off loose dirt or foreign matter.

) Wipe condenser coil guard with a cloth moistened with drycleaning solvent, (item 8, table E-1).

) Inspect condenser coil guard for damage.

ation.

) Align holes in condenser guard with holes in housing

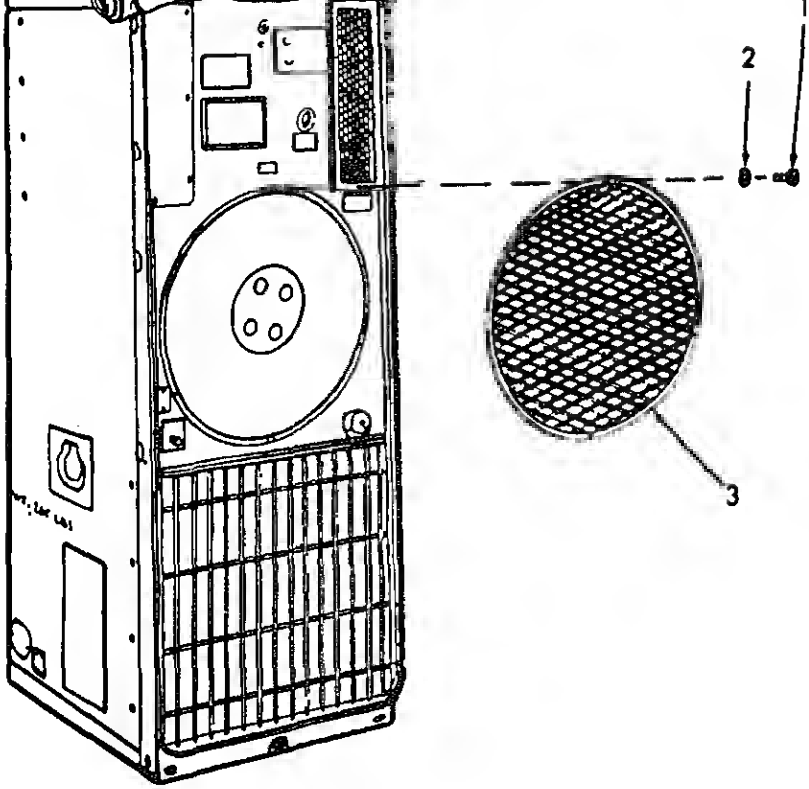
) Secure condenser coil guard (4) with screws (1), lockwashers (2), and flat washers (3).

) Install canvas cover (para 4-8).

ENSER FAN GUARD.

tion

ndenser fan guard is mounted near the middle of the rea the air conditioner. The guard is fabricated from heav nded metal mesh mounted is a circular sheet-metal frame ng screw holes in the frame are purposely arranged in a al pattern, so that the fan guard can be installed in o his installation is necessary to orient the angle of th tal so that hot exhaust air will be deflected upward, a ndenser coil intake.



emoval

(1) Remove screws (1) and lockwashers (2) securing c fan guard (3) to housing.

(2) Remove condenser fan guard.

ervice and Inspection.

WARNING

Dry cleaning solvent, P-D-680, (item 3, table E-1), used to clean parts is potentially dangerous to personnel and property. Avoid repeated and prolonged skin contact. Do not use near open flame or excessive heat. Flash point of solvent is 100°F (38°C).

(1) Brush off loose dirt or foreign matter.

(2) Secure condenser fan guard (3) with screws (1
lockwashers (2).

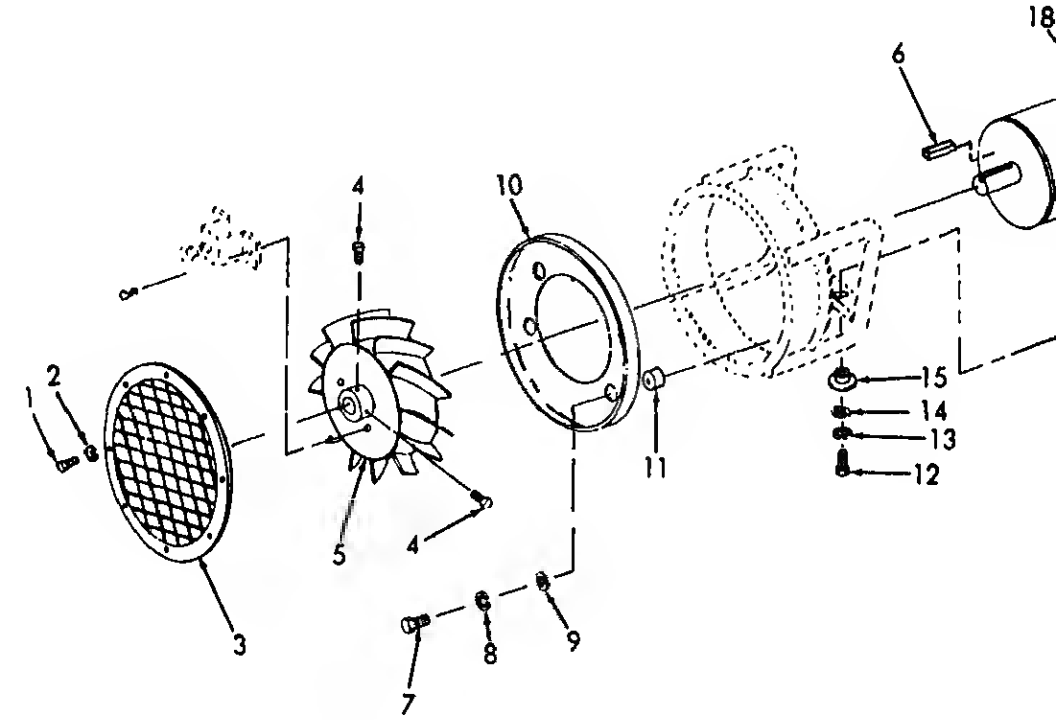
. MOTOR SUPPORT.

Description.

The two-speed fan motor support is a welded fabricatio
and formed sheet metal which supports the rear end of t
s attached to the rear panel with rivet nuts which are
ch the condenser fan guard to the unit.

Special Tools

Wheel puller.



Preliminary Requirements,

Remove Canvas Cover (para 4-8) or roll up and secure w
ons.

Removal.

(1) Remove screws (1), and washers (2) that attac

attach baffle (10) and bushings (11).

(7) Remove baffle (10) and bushings (11).

(8) Remove screws (12), lockwashers (13), and wa

(9) Remove grommet (15), motor mount bushing (16 (17) from under motor (18).

Inspection.

(1) Inspect motor mount bushing. Replace if def

(2) Four bushing sizes are available as follows:

(a) 13215E9824 -1, 0.094 inch

(b) 13215E9824 -2, 0.125 inch

(c) 13215E9824 -3, 0.156 inch

(d) 13215E9824 -4, 0.188 inch

Installation.

(1) Install proper bushing (16) into base of mot

(2) Insert shim (17), grommet (15).

(3) Install screw (12), lockwasher (13), washer

(4) Install baffle (10) and bushing (11), using lockwasher (8), and washer (9).

CAUTION

Do not hammer the impeller onto the motor shaft. The motor bearings would be damaged. If difficu is encountered, dress out rough spots on the sha with a fine file, stone or abrasive cloth. Appl coating of light oil to ease assembly.

(5) Align key ways in shaft and impeller, instal press impeller (5) onto shaft. The end of t shaft should be even with the face of the hu impeller is completely in position. Tighten (4) finger tight. Starting with the keyway

om the intake, the condenser fan guard is designed
that it can be installed in only one way. All screw
les must match to permit proper installation.

Install condenser fan guard (3) using screws (1) and lockwasher (2).

) Install canvas cover (para 4-8), if required.

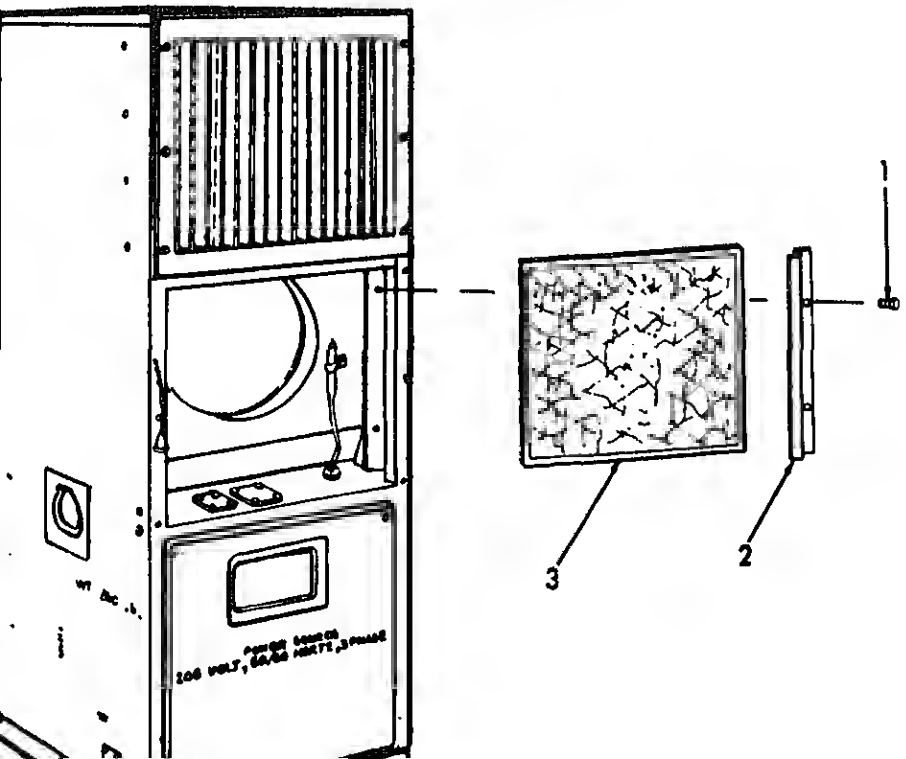
ILTER.

ion.

filter consists of a shredded aluminum foil maze held
ens in an aluminum channel frame. The filter can be
re-used repeatedly. Airflow markings (arrows) printed
ke it easy to replace the filter in the correct positio

ary Procedure:

move air intake grille (para 4-11).



d. Service and Inspection.

WARNING

Do not use compressed air for cleaning purpose
cept where reduced to less than 30 psi and the
with effective chip guarding and personal prot
equipment.

WARNING

Dry cleaning solvent P-D-680, (item 3, table E
used to clean parts is potentially dangerous t
personnel and property. Avoid repeated and pr
longed skin contact. Do not use near open fla
or excessive heat. Flash point of solvent is
100°F (38°C).

(1) Clean air filter with dry cleaning solvent
table E-1) or warm soapy water.

(2) Dry air filter with low pressure compresse

(3) Inspect air filter for damaged or clogged

(4) Replace air filter if damage is indicated.

(5) Spray air filter with Filter-Kote (item 5,

e. Installation

(1) Install air filter (3) in housing with the
dicator in proper position.

(2) Align holes in air filter retaining bracke
holes in housing.

(3) Secure air filter retaining bracket (2) wi
fasteners (1).

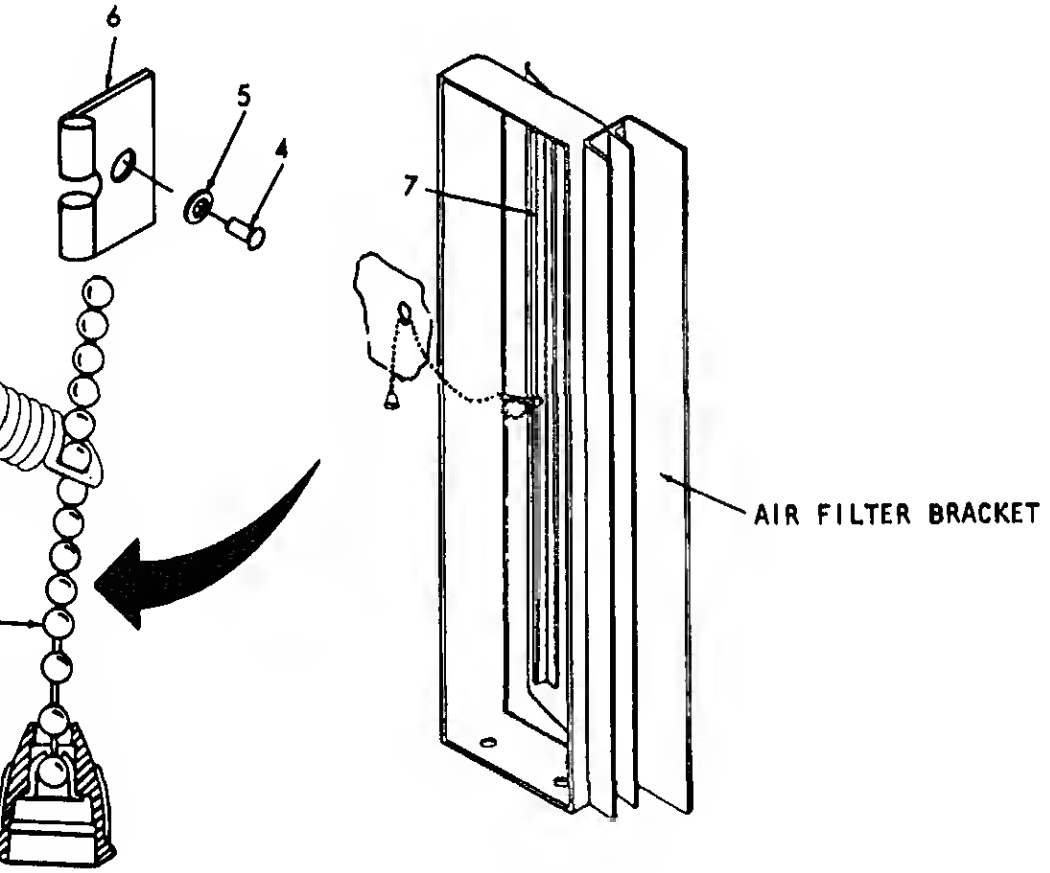
(4) Install air intake grille (para 4-11).

s except fully closed and acts as a snubber to minimize
sudden closing of the damper door.

ary Procedures:

Remove air intake grille (para 4-11).

Remove air filter (para 4-18).



Unsnap pendant (1) from chain (2).

Remove pendant (1).

Unhook spring (3) from chain (2) and housing.

Remove chain (2).

d. Inspection and Repair.

(1) Inspect pendant, spring and fresh air dampe damage.

(2) Replace pendant, spring, and chain if damag indicated.

e. Installation.

(1) Align holes in chain retainer (6) and flat with hole in housing.

(2) Secure chain retainer (6) and flat washer ((4).

NOTE

Rivet must be flat so that door will open and c properly.

(3) Insert one end of spring (3) into hole in h

(4) Hook the other end of spring around chain.

(5) Align slot in pendant (1) between the last chain (2).

(6) Snap pendant (1) onto chain (2).

(7) Install air filter (para 4-18).

(8) Install air intake grille (para 4-11).

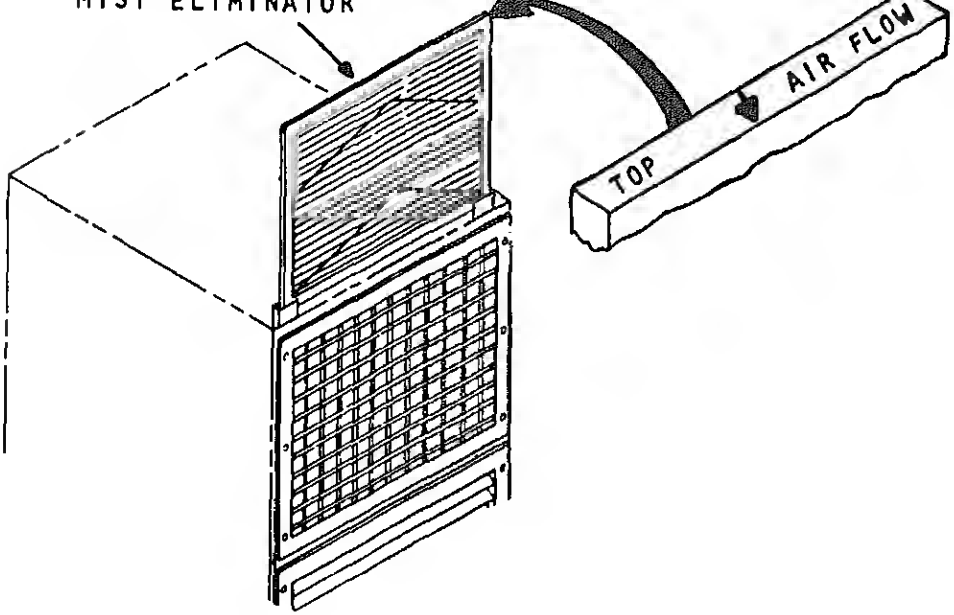
4-20. MIST ELIMINATOR.

a. Description.

The mist eliminator is composed of eight double laye num mesh held between 1/4-inch mesh panels in an aluminu urpose of the mist eliminator is to trap droplets of con formed on the evaporator coil, so that they will not be b air conditioned space.

b. Preliminary Procedure:

(1) Remove canvas cover (para 4-8).



Pull mist eliminator up and out of housing.

and Inspection.

WARNING

ry cleaning solvent, P-D-680 (item 3, table E-1), sed to clean parts is potentially dangerous to ersonnel and property. Avoid repeated and pro- onged skin contact. Do not use near open flame or xcessive heat. Flash point of solvent is 100°F 38°C).

WARNING

o not use compressed air for cleaning purposes xcept where reduced to less than 30 psi and then nly with effective chip guarding and personal rotective equipment.

) Clean mist eliminator with warm soapy water or dry cleaning solvent (item 3, table E-1).

flow from the evaporator coil.

(1) Locate the TOP and AIR FLOW arrows on the m eliminator.

(2) With the TOP of the mist eliminator at the housing and AIR FLOW arrows pointing toward housing, install it in the mist eliminator

(3) Install top panel, (para 4-9).

(4) Install canvas cover (para 4-8).

4-21. BLOCK-OFF PANEL.

The block-off panel may be installed when the co is removed from the air conditioner to operate the unit b control. To install the block-off panel and relocate th panel proceed as follows:

(1) Disconnect electrical power from air condit

(2) Remove lower panel (1), by loosing two turn fasteners (2).

(3) Remove air intake grille (3) by loosening t fasteners (4).

(4) Remove screw (5), filter retainer (6), and

(5) Remove screw (8) securing thermostat tube b clamp (10). Route bulb and tube through grommet (11).

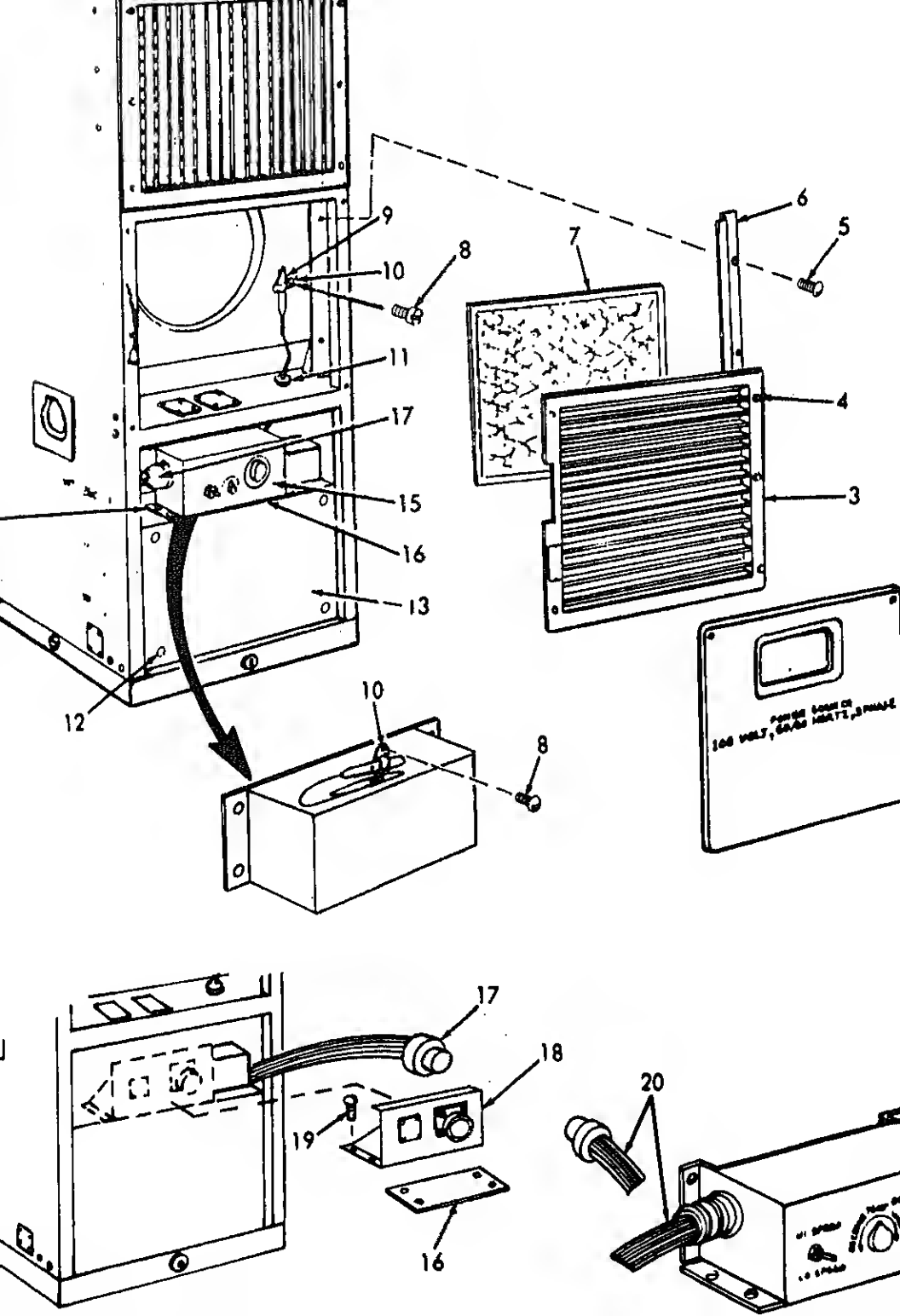
(6) Loosen four turn-button fasteners (12) that junction box (13) to air conditioner.

CAUTION

When performing the following procedures. Do n bend bulb or tube (9).

(7) Carefully remove the junction box (13) from conditioner.

(8) Remove four turn-button fasteners (14) that panel (15) and gasket (16) to junction box (13).


9
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(11) Attach electrical connector (17) to block off
8).

(12) Install block-off assembly (18), using gasket
rews (19) to junction box (13).

NOTE

Replace gasket if damaged or defective.

(13) Reinstall junction box (13), and tighten turn
steners (12).

(14) Reinstall air intake filter and air intake gr
rforming step 4 and step 3, above, in reverse order of re

(15) Connect remote control cable (20) to block-of
d control panel.

(16) Locate control panel as required.

NOTE

Remote control connenction can be made as above o
by removing the electrical connector from the blo
off assembly and installing it in one of the alte
nate electrical connection locations shown on fig
4-3.

22. INSTRUCTION PLATES

Preliminary Procedures:

(1) Remove lower panel (para 4-12).

(2) Remove control panel (para 4-24).

(3) Remove rotary selector switch (para 4-25).

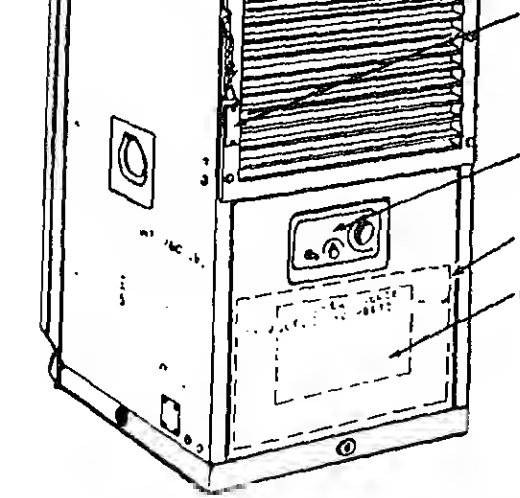
(4) Remove temperature control thermostat (para 4-26).

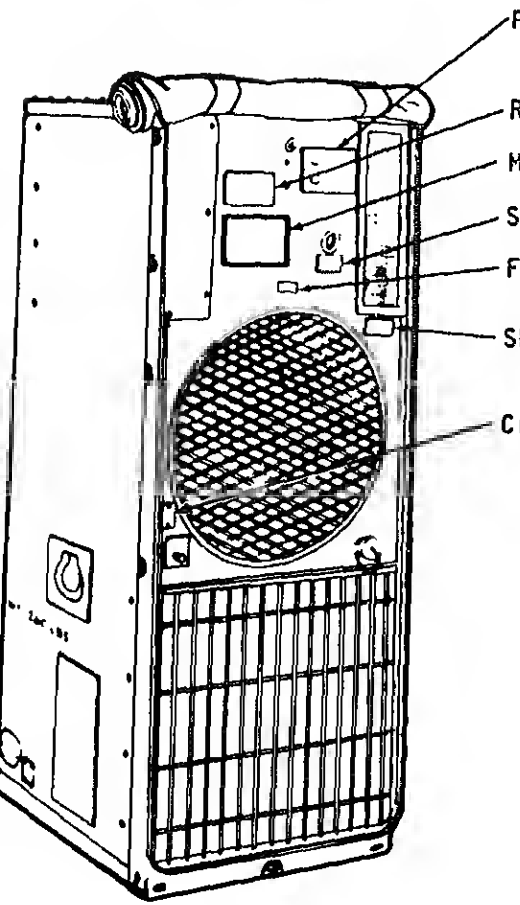
(5) Remove Fan Speed switch (para 4-27).

Removal.

ont of Housing

Wiring Diagram Plate


DAMPER CONTROL
CONTROL PANEL
WIRING DIAGRAM
REFRIGERATION DIAGRAM


PRESSURE CUTOUT SWITCH
REFRIGERANT TYPE AND CHARGE
MILITARY IDENTIFICATION
SIGHT-GLASS COLOR CHANGE
FAN ROTATION
SERVICE GAUGE ACCESS
CIRCUIT BREAKER

1 - Drill out rivets that secure the control plate to the control panel.

2 - Remove control panel designation plate.

Rear of Housing

Circuit Breaker Reset Information Plate

1 - Drill out blind rivets that secure the ci reset information plate to the rear of ho

2 - Remove circuit breaker reset information

Fan Rotation Indicating Plate

1 - Drill out blind rivets that secure the fa indicating plate to the rear of housing.

2 - Remove fan rotation indicating plate.

Pressure Cut-Out Switch Information Plate

1 - Drill out blind rivets that secure the pr switch information plate.

2 - Remove pressure cut-out switch informatio

Moisture Indicator Information Plate

1 - Drill out blind rivets that secure the mo indicator information plate to the rear o

2 - Remove moisture indicator information pla

Refrigeration Information Plate

1 - Drill out blind rivets that secure the re information plate to rear of housing.

2 - Remove refrigeration information plate.

Service Gauge Valves Instruction Plate

1 - Drill out blind rivets that secure the se valves instruction plate.

2 - Remove service gauge valves instruction p

Instructions Plates with blind rivets, or adhesive as

NSATE DRAINAGE SYSTEM.

ion.

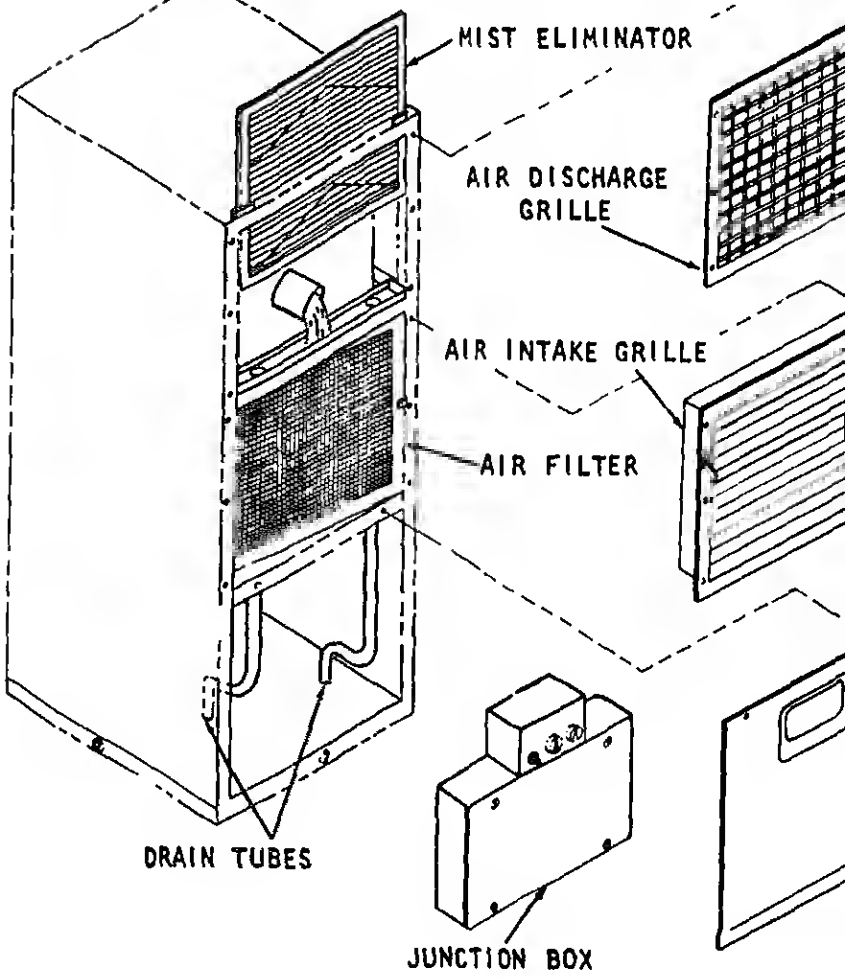
densate drainage system consists of a drip pan, mounted
evaporator coil, and two tubes leading from the ends of
to the base plate. The tubes are equipped with spring
check valves at their bottom ends, to prevent the bypas
through the tubes and around the evaporator intake. Th
f the air conditioner is fitted with pipe-threaded hole
chment of standard plumbing fittings or hose to conduct
ce to a remote location.

ne condensate drainage system occupies both sides of th
air conditioner from top to bottom, the top panel, lowe
ch evaporator grilles must be removed to gain access to
, the air filter and the mist eliminator must be remov

PAN ASSEMBLY.

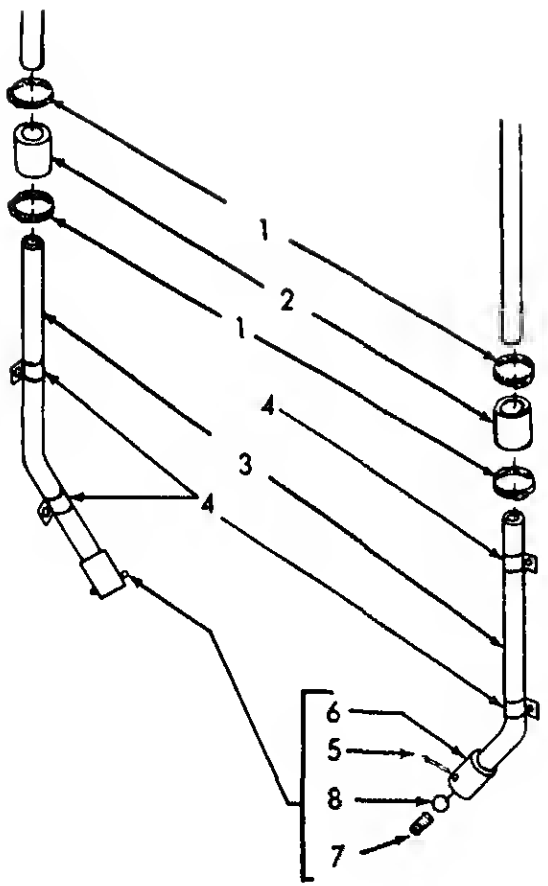
ary Procedures.

- Remove canvas cover (para 4-8).
- Remove top panel (para 4-9).
- Remove air discharge grille (para 4-10).
- Remove mist eliminator (para 4-20).
- Remove air filter (para 4-18).
- Remove lower panel (para 4-12).
- Remove junction box (para 4-28).



b. Inspection/Test.

Place a 2 by 4 inch board under one side of the a
to tilt it slightly, then pour about one pint (one-ha
water into the lower end of the drip pan below the eva
Verify that the water flows out of the drip pan throug
tube. Tilt the air conditioner the opposite direction
flow test on the other side. Water should drain free
tubes. If it does not, remove and repair or replace t
(refer to para 4-23.2).



in Tubes.

Loose hose clamps (1) securing hoses (2) to drain tub (3).

Remove hoses (2) and clamps (1).

Pull drain tubes (3) out of spring clips (4).

l Check Assemblies

Remove cotter pin (5) from ball check seat (6).

Remove spring (7) and ball (8) from ball check seat (6).

Dry cleaning solvent, P-D-680, (item 3, table E-1 used to clean parts is potentially dangerous to personnel and property. Avoid repeated and prolo ed skin contact. Do not use near open flame or e cessive heat. Flash point of solvent is 100°F (38°C).

(1) Flush out hoses and tubing with warm soapy wa

(2) Use a small diameter brush or piece of soft w clean out any accumulation of dirt or foreign from hoses and tubing.

(3) Inspect hoses and tubing for split or deterio condition.

(4) Clean ball and spring in dry cleaning solvent table E-1) and dry thoroughly.

(5) Inspect ball and spring for damage.

(6) Replace any defective parts.

Installation.

Ball Check Assemblies

(1) Install ball (8) and spring (7) into ball che (6).

(2) Secure ball and spring with cotter pin (5).

Drain Tubes

(1) Press drain tube (3) into spring clips (4) in housing.

(2) Install hose clamps (1) and hoses (2).

Final Installation (install the following as needed.)

(1) Install junction box (para 4-28).

(2) Install lower panel (para 4-12).

(3) Install air filter (para 4-18).

(4) Install mist eliminator (para 4-20).

ITROL PANEL.

ption.

ontrol panel assembly is mounted on top of the junction
lower panel. It contains the three controls by means
functions of the air conditioner are controlled. These
omprise the following: Rotary Selector Switch, Tempera
ermostat and a Two-Speed Fan Switch.

WARNING

Disconnect power from the air conditioner before performing maintenance on the electrical system. The voltage used can be lethal.

following requirements are necessary for organizational
e of the control panel.

Equipment: Multimeter

al Tools: None

al Environmental Conditions: None

al Safety Precautions:

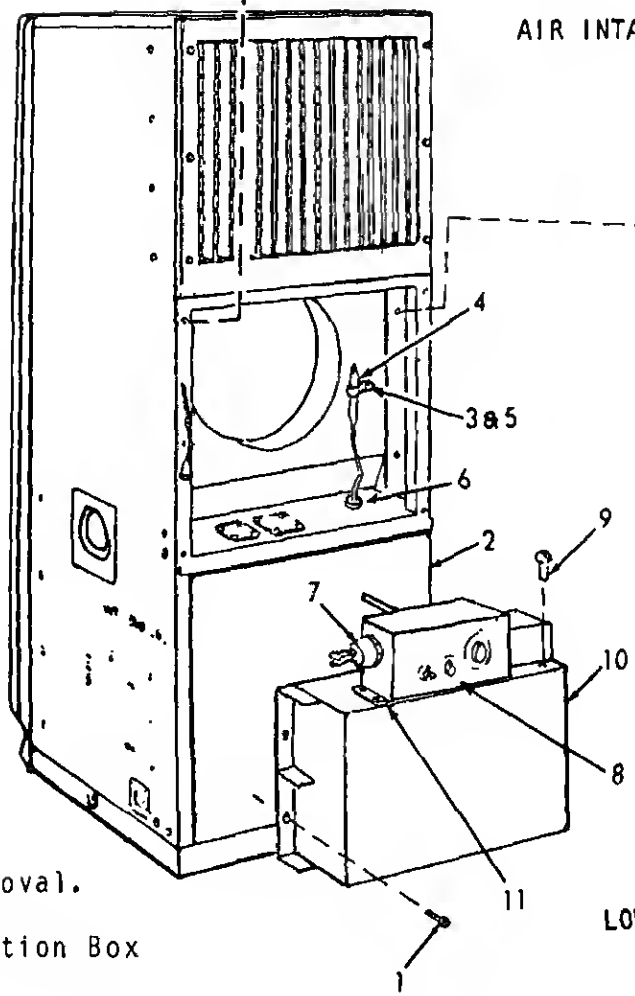
o Disconnect the unit from source of power.

minary Procedures:

o Remove lower panel (para 4-12).

o Remove air intake grille (para 4-11).

o Remove air filter (para 4-18).



b. Removal.

Junction Box

(1) Loosen fasteners (1) that attach jun
case (2).

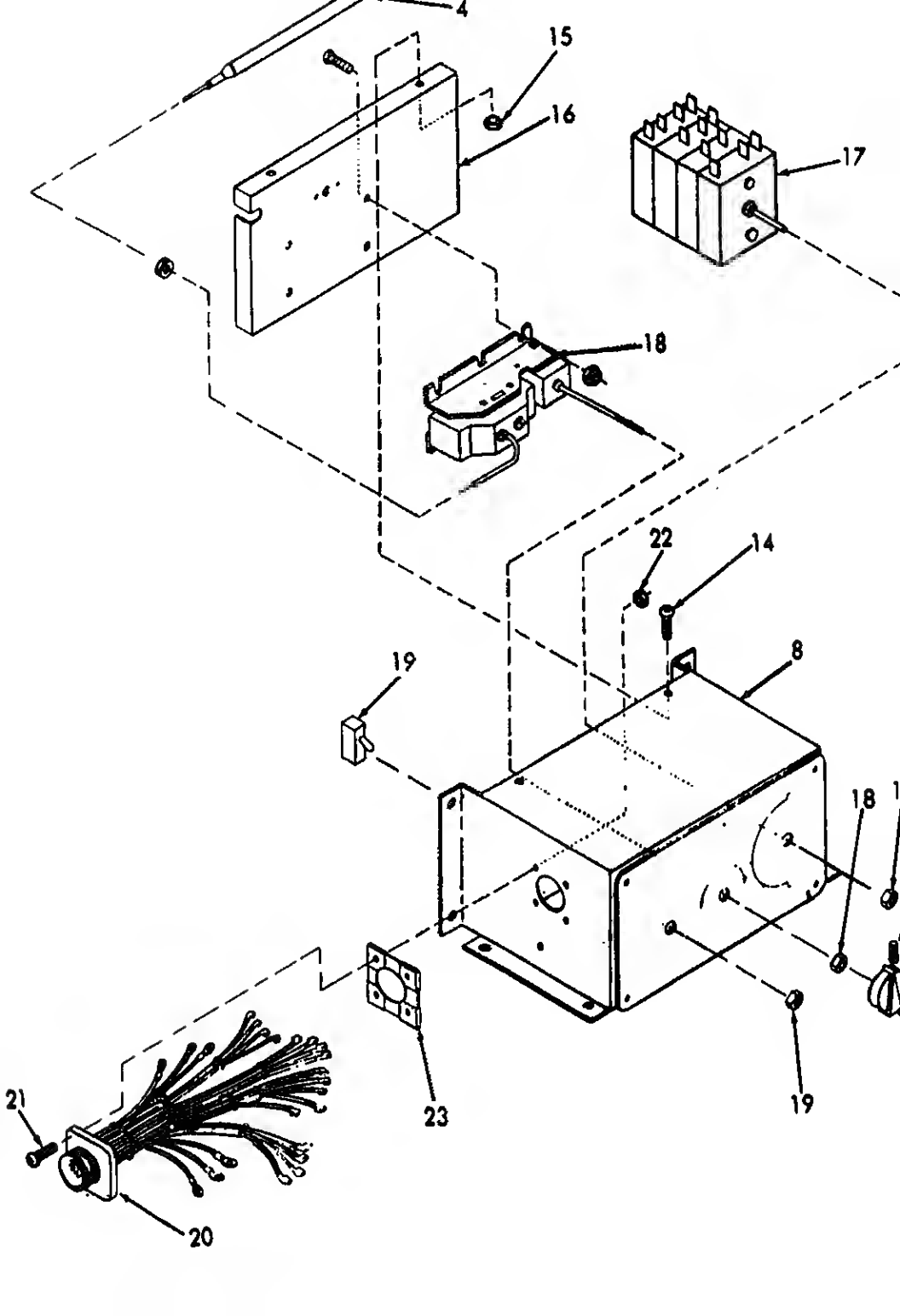
(2) Move junction box as needed for acce

CAUTION

Use care to prevent kinking of the therm
illary tube when removing thermostat sen

Thermostat Sensing Element

(1) Loosen screw (3) securing thermostat
in clamp (5).


4
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(2) Remove screws (9) securing control pane
box (10).

(3) Remove control panel (8) and gasket (11
box (10).

(4) Loosen setscrew (12) in knob (13).

(5) Remove knob (13) from temperature contr

(6) Remove screws (14), nuts (15), and rear
control panel.

c. Inspection and Repair.

Control Panel

(1) Inspect gasket (11) for damage.

(2) Replace gasket if damage is indicated.

(3) Inspect all components and wiring conne
security of attachment.

(4) Tighten any loose component or wiring c

Rotary Selector Switch

(1) Inspect rotary selector switch (17) for

(2) Test and replace rotary selector switch
it is defective.

Temperature Control Thermostat

(1) Inspect temperature control thermostat

(2) Test and replace temperature control th
4-26) if it is defective.

Fan speed (Toggle) Switch

(1) Inspect toggle switch (19) for damage.

(2) Test and replace toggle switch (para 4-
defective.

Electrical Connector (J7)

CAUTION

Electrical wires are still connected to the electrical connector. Use care when pulling it away from control panel cover.

(b) Carefully pull electrical connector (20) awa control panel (8).

(c) Tag and unsolder loose wires from solder wel

(d) Insert ends of wires in solder wells.

(e) Solder (item 12, table E-1) wires in place a remove tags.

(f) Align holes in electrical connector (20) and (23) with holes in control panel (8).

(g) Secure electrical connector (20) with screws and nuts (22).

cal Connector Gasket

1) Remove screws (21) and nuts (22) securing electri connector (20) to control panel (8).

CAUTION

Electrical wires are still connected to the electrical connector. Use care when pulling it away from control panel cover.

2) Carefully pull electrical connector (20) away fro control panel (8).

3) Inspect gasket (23) for damage.

4) If gasket is damaged, proceed as follows:

(a) Tag and remove all control panel wiring harn electrical leads.

(b) Completely remove electrical connector (20)

(c) Secure gasket and electrical connec
with screws (21) and nuts (22).

(5) If gasket is NOT damaged, proceed as fol

(a) Align holes in gasket (23) and hole
connector (20) with holes in contro

(b) Secure gasket and electrical connec
screws (21), and nuts (22).

Knobs

(1) Inspect knobs for damaged condition.

(2) If damage is indicated, replace knob as

(a) Loosen setscrew (12) in knob (13) a

(b) Install new knob (13) and tighten s

d. Installation

Control Panel Cover

(1) Align holes in cover (16) with holes in
(8).

(2) Secure control panel cover with screws (
(15).

Control Panel

(1) Align holes in control panel with holes
box.

(2) Secure control panel with screws (9).

(3) Connect electrical connector (7) to cont

CAUTION

Use care to prevent kinking of the thermosta
when installing thermostat sensing bulb.

(3) Install lower panel (para 4-12).

(4) Install conrol panel (para 4-24).

ostat Sensing Bulb

(1) Carefully slide sensing bulb (4) up through gromme (6).

(2) Install sensing bulb in clamp (5) and tighten scre (3).

ion Box

(1) Replace junction box (10).

(2) Turn turn-button fasteners (1).

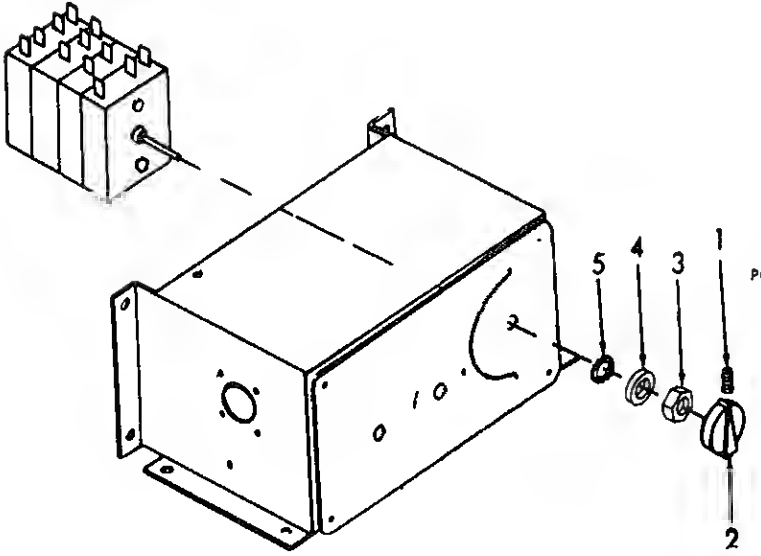
OTARY SELECTOR SWITCH (S1).

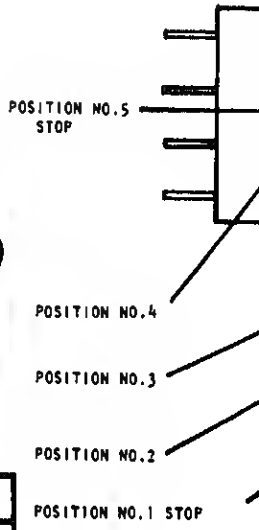
ription.

Rotary Selector Switch is a five-position rotaty switch of four "wafers" or individual five-position elements. of the switch connects various functional units in each tion.

iminary Procedures:

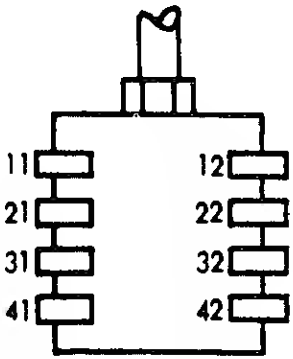
Remove control panel (para 4-24).

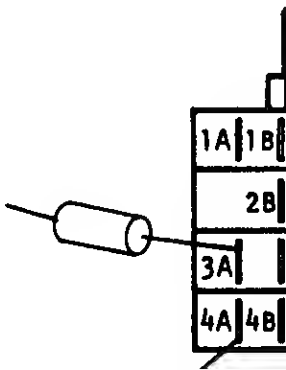




SELECTOR SWITCH POSITION	SWITCH FUNCTION	SWITCH WAFERS AND TERMINALS CONNECTED			
		A	B	C	D
1	HEAT (HIGH)	12 AND 1A	21 AND 2C 22 AND 3A	31 AND 3C 32 AND 3A	41 AND 4C 42 AND 4A
2	HEAT (LOW)	12 AND 1A	21 AND 2C 22 AND 2B	31 AND 3C	
3	OFF				
4	VENT		21 AND 2C 22 AND 2B	31 AND 3C	
5	COOL	12 AND 1B 11 AND 1D	21 AND 2C 22 AND 2B	31 AND 3C 32 AND 3B	41 AND 4C 42 AND 4B

WIRING CHART





selector switch to control panel.

(3) Tag and disconnect electrical leads from selector switch.

(4) Remove selector switch.

(1) Turn shaft of selector switch counter-clockwise unt stops (POSITION 1).

(2) Refer to wiring chart and check for continuity betw terminals shown for wafers A, B, C and D, Position

(3) Turn shaft of selector switch clockwise one click t Position No. 2. Check for continuity between termi shown for wafers A, B, and C, Position 2.

(4) Turn shaft of selector switch clockwise two clicks Position No. 4. Check for continuity between termi shown for wafers B and C Position 4.

(5) Turn shaft of selector switch clockwise one click t Position No. 5. Check for continuity between termi shown for wafers A, B, C and D, Position No. 5.

llation

(1) Connect electrical leads to selector switch and rem tags.

(2) Install selector switch shaft through hole in contr panel.

(3) Secure selector switch with lockwasher (5), washer and nut (3).

(4) Install knob (2) and tighten setscrew (1).

Installation

(1) Install control panel (para 4-24).

(2) Install lower panel (para 4-12).

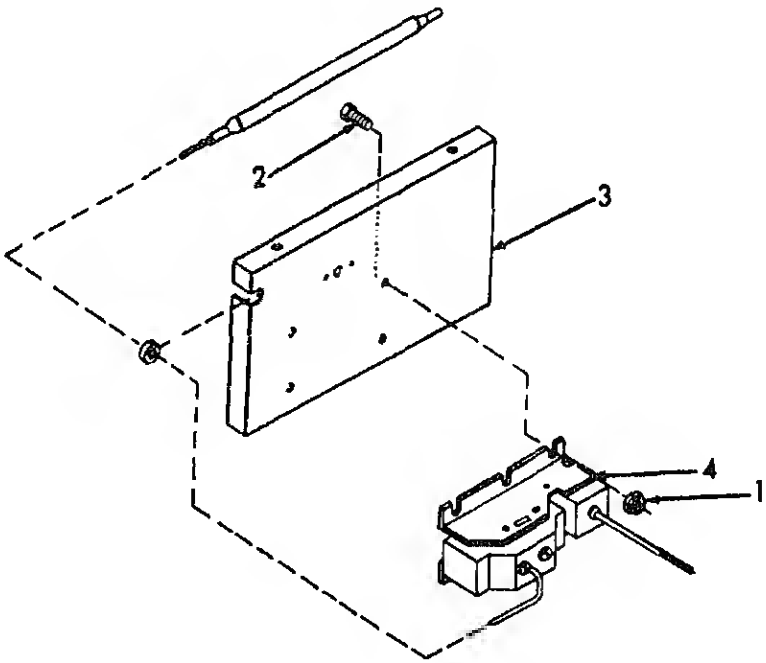
(3) Install air filter (para 4-18).

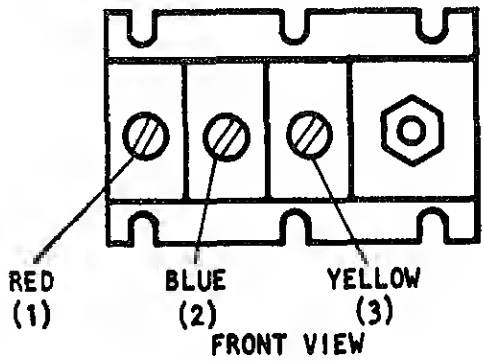
a. Description:

The Temperature Control and thermostat is set a
temperature level to heat or cool the conditioned ar
with a feedback signal from a sensing bulb which cau
open or close on temperature rise or temperature dro

b. Preliminary Procedures:

Remove control panel (para 4-24).





(3) Remove thermostat.

ing

MPERATURE RISE CUNTINUITY CHECK

(1) Place temperature sensing bulb in a container of w at a temperature of 80^0 to 90^0F (28^o to 32^oC).

(2) While facing switch shaft, rotate shaft counterclo to limit.

(3) Check continuity between terminal 1 (REU) and term (YELLOW). Replace temperature control thermostat open circuit is found.

MPERATURE DROP CUNTINUITY CHECK

(1) Place temperature sensing bulb in a container of w at a temperature of 40^0 to 50^0F (4^0 to 10^0C).

(2) While facing switch shaft, rotate shaft clockwise limit.

(3) Check continuity between Terminal 1 (REU) and Term (BLUE). Replace temperature control thermostate i open circuit is found.

allation.

(1) Connect electrical leads to thermostat and remove tags.

(2) Attach thermostat (4) with screws (2) and nuts (1) control panel (3).

(3) Install control panel (para 4-24).

(4) Install lower panel (para 4-12).

(5) Install air filter (para 4-18).

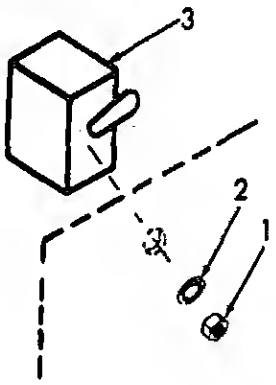
(6) Install air intake grille (para 4-11).

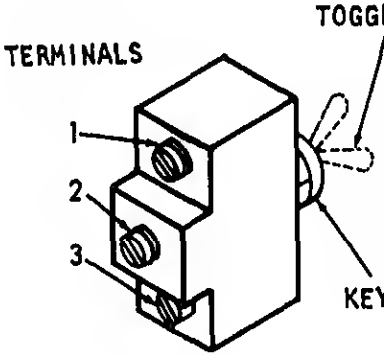
a. Description.

This two-position toggle switch connects or disc
auxiliary set of windings in the evaporator/condenser
connected, these windings double the speed of the mot
3450 rpm, thereby increasing airflow.

b. Preliminary Procedures:

Remove control panel (para 4-24).





c. Removal.

(1) Tag and disconnect electrical leads fro

(2) Unscrew and remove nut (1) and lockwash
toggle switch (3) to control panel.

d. Testing.

(1) With keyway in downward position, press
Check continuity between Terminals 1 an

(2) With keyway in downward position, press
Check continuity between Terminals 2 an

(3) Replace two speed switch if an open cir

e. Installation.

(1) Install toggle switch lever through hol
panel.

(2) Secure toggle switch (3) with lockwashe
(1).

7) Install air intake grille (para 4-11).

CTION BOX

ɔtion.

unction box is located just inside the lower panel. It p
ing or mounting facilities for the electrical components
ɔl the automatic switching of power and control circuits
s operating components of the air conditioner. These com
ude the control transformer, rectifier, armature relays,
relay, the circuit breaker, and associated fuses and ter
s.

WARNING

Disconnect power from the air conditioner before
performing maintenance on the electrical system.
The voltage used can be lethal.

llowing requirements are necessary for organizational ma
the junction box.

Equipment: Multimeter
Power Supply capable of producing 28 VDC ± 1V

al Tools: None

al Environmental Conditions: None

al Safety Precautions:

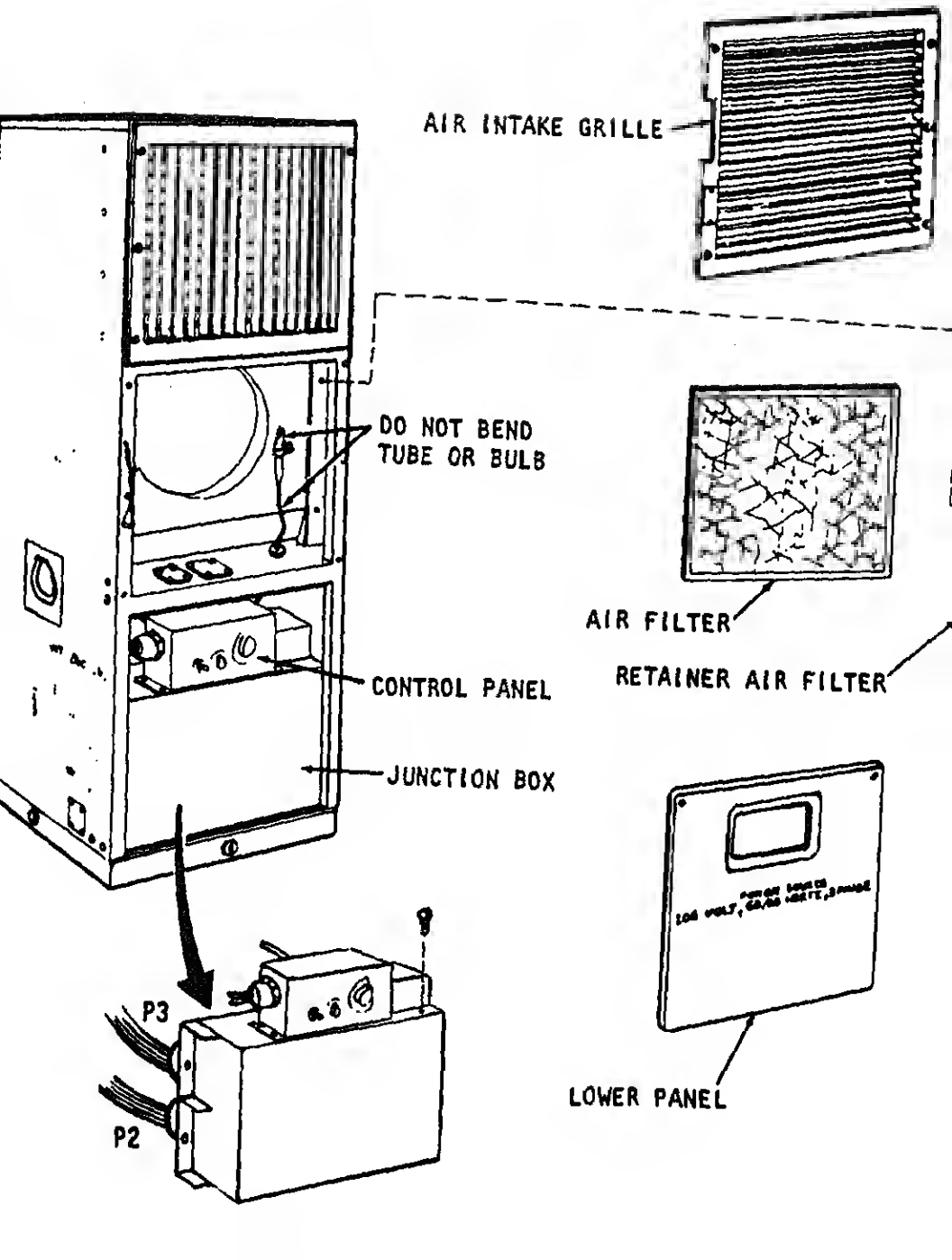
1) Disconnect the unit from source of power.

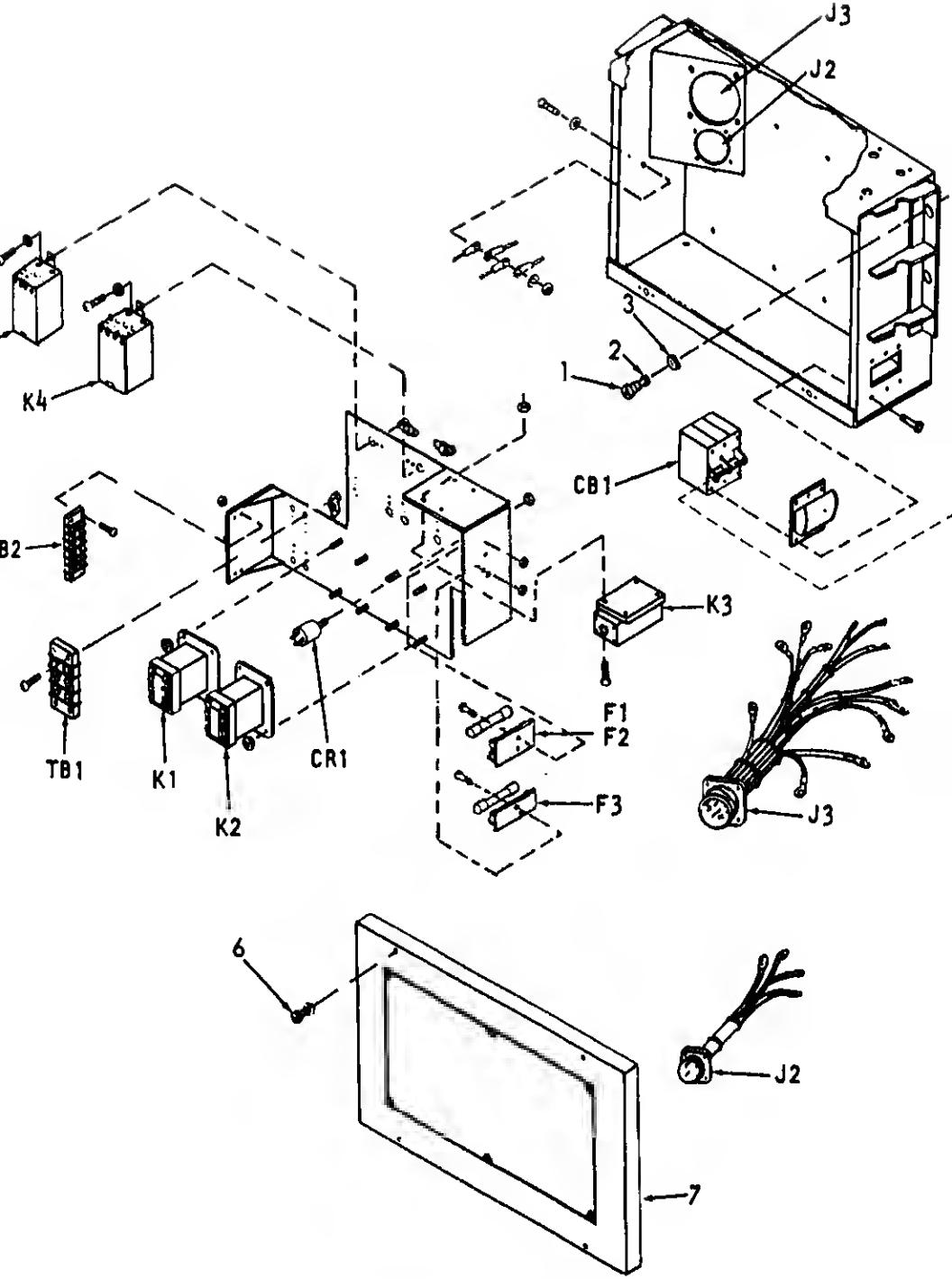
inary Procedures:

) Remove lower panel (para 4-12).

) Remove air intake grille (para 4-11).

) Remove air filter (para 4-18).


AIR INTAKE GRILLE
DO NOT BEND TUBE OR BULB
AIR FILTER
RETAINER AIR FILTER
CONTROL PANEL
JUNCTION BOX
P3
P2
LOWER PANEL


J3
J2
3
2
1
K4
CB1
B2
K3
TB1
K1
K2
CR1
F1
F2
F3
J3
6
J2
7

Do not bend tube or bulb located behir
panel and air filter.

(2) Pull junction box forward and disconnec
(if required).

(3) Loosen turn-button fasteners that attac
the top of the junction box (if require

(4) Remove nut (4) on circuit breaker rod

(5) Remove junction box (if required).

(6) Loosen turn-button fasteners (6), and

c. Inspection and Repair.

Junction Box

(1) Inspect all components and wiring
security of attachment.

(2) Tighten any loose component or wi

Fuses, F1, F2 and F3

(1) Inspect fuses F1, F2 and F3 for d

(2) Test and replace fuses (para 4-29

Circuit Breaker, CB1

(1) Inspect circuit breaker and reset

(2) Test and replace circuit breaker
defective.

Heater and Motor Relays, K1, K2, K4, and K5

(1) Inspect relays for damage.

(2) Test and replace relays (para 4-3
are defective.

Time Delay Relay, K3

2) Test and replace transformer (para 4-35) if it is defective.

l Boards, TB1 and TB2

Refer to paragraph 4-36 and inspect and replace termi boards as required.

cles J3 and J2

Refer to paragraph 4-37 and inspect and replace elect connectors as required.

ers CR1 and CR2

1) Inspect rectifiers for damage.

2) Test and replace rectifiers (para 4-38) if they a defective.

lation.

n Box

1) Align holes in junction box cover (7) with holes junction box.

2) Secure junction box cover (7) by tightening turn- fasteners (6).

3) Connect electrical connector P3 and P2.

4) Reinstall rod (5) using nut (4).

CAUTION

Do not bend tube on rear of control panel.

5) Align holes in junction box with holes in housing.

6) Secure junction box with screws (1), washers (2), lockwashers (3).

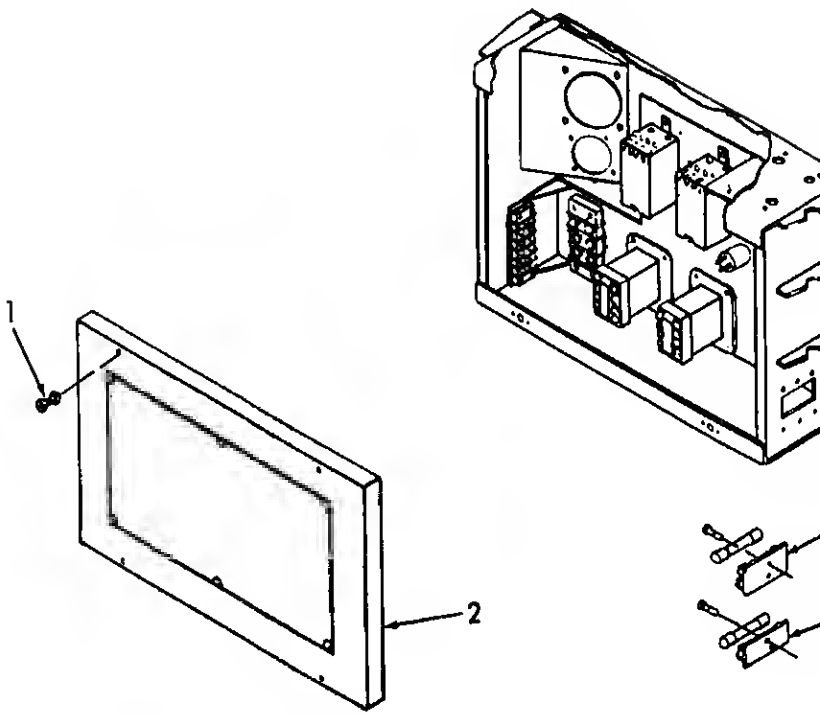
7) Install lower panel (para 4-12).

4-29 FUSE REPLACEMENT.

a. Preliminary Procedure.

(1) General Procedure (para 4-28).

(2) Remove lower panel (para 4-12).



b. Removal.

Junction Box

Loosen turn-button fasteners (1) and rem
cover (2).

Fuses

Remove fuses F1, F2, or F3.

c. Test.

Test fuses for continuity. Replace defe

F1 F2 F3	10A 10A 5A	AC Voltage to Control Circuits DC Voltage

(2) Align holes in junction box cover (2) with holes junction box.

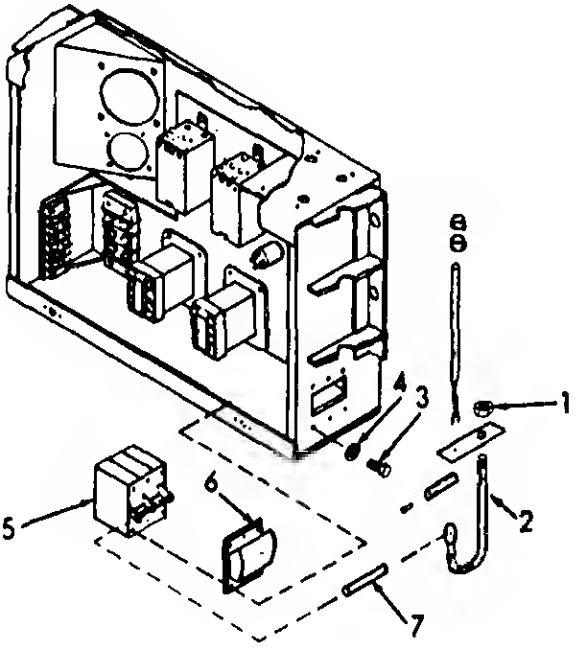
(3) Secure junction box cover (2) by tightening turn-fasteners (1).

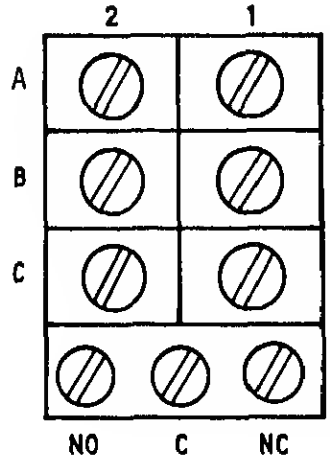
(4) Install lower panel (para 4-12).

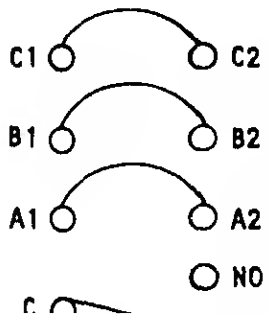
CIRCUIT BREAKER.

liminary Procedures.

Remove junction box (para 4-28).







(3) Remove screws (3) and washers (4) that secur
breaker (5) to junction box.

(4) Remove circuit breaker.

(5) Remove circuit breaker cover (6).

(6) Remove connecting pin (7) from circuit break

c. Testing.

CONTINUITY CHECK

(1) Place the circuit breaker in the ON position

(2) Using a multimeter, test for continuity betw
following terminals:

C1 and C2
B1 and B2
A1 and A2
C and NO

(3) Replace circuit breaker if there is no conti

SHORT CIRCUIT TEST

(1) Place the circuit breaker in the OFF positio

(2) Using a multimeter, test for a short circuit
following terminals:

C1 and C2
B1 and B2
A1 and A2
C and NO

(3) Replace circuit breaker if there is a short

d. Installation.

(1) Install connecting pin (7) on circuit breake
circuit breaker rod (2).

(2) Reinstall wires and remove tags.

(3) Align holes in circuit breaker (5) with hol
circuit breaker cover (6) and junction box.

(5) Install circuit breaker rod (2) and nut (1).

(6) Install junction box (para 4-28).

(7) Install lower panel (para 4-12).

EATER RELAY (K2).

ription

heater relay (K2) closes to supply power to the electri
as called for by the HI-HEAT or LO-HEAT setting of the r
switch (S1).

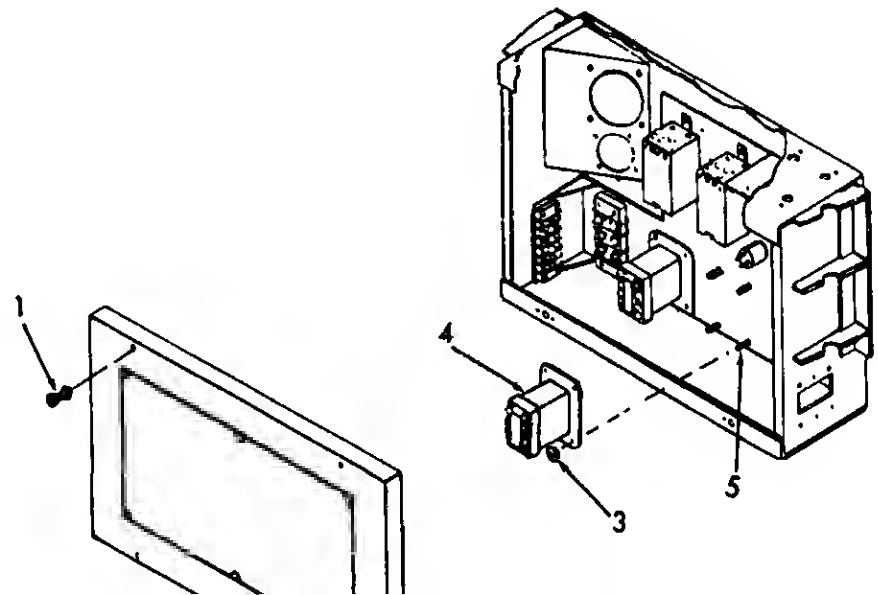
WARNING

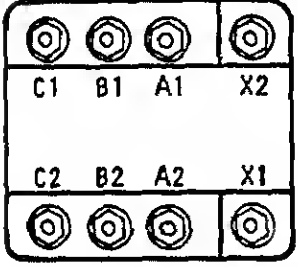
Be careful when working with high voltage. Failure to comply can result in serious injury or death.

iminary Requirements.

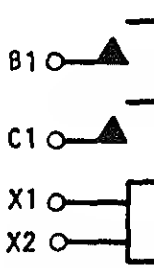
(1) Remove lower panel (para 4-12)

(2) Remove junction box (para 4-28).





TERMINAL LOCATION



SCHEMATIC

DE-ENERGIZED CHECK FOR CIRCUIT BETWEEN
A1 AND A2
B1 AND B2
C1 AND C2
TABLE A

DE-ENERGIZED CHECK FOR CONTINUITY BETWEEN
X1 AND X2
TABLE B

c. Removal

(1) Loosen turn-button fasteners (1), and (2).

(2) Tag and remove all wires from relay.

(3) Remove nuts (3) that secure relay (4)

d. Testing

(1) With relay de-energized, check for sho terminals shown in Table A. If any sh found, replace relay.

(2) With relay de-energized, check for con terminals shown in Table B. If any op found, replace relay.

(3) Energize relay coil between terminals

(5) De-energize relay.

(6) Replace relay if defective.

stallation.

(1) Align holes in relay (4) with studs (5) in jur box.

(2) Secure relay with nuts (3).

(3) Install wires and remove tags.

(4) Install front panel (2) and secure with turn-t fastners (1).

(5) Install lower panel (para 4-12).

COMPRESSOR MOTOR RELAY (K1).

scription.

he compressor start relay operates in conjunction with relay (K3) and the high- and low-pressure cutout switc) to insure proper starting sequence of the refrigerar r when either S6 or S7 require non-operation.

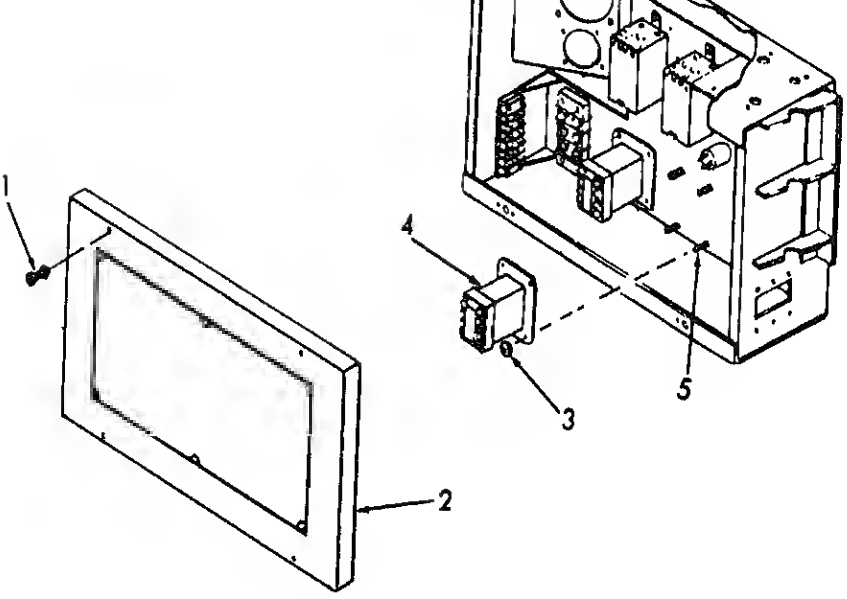
WARNING

Be careful when working with high voltage. Failur to comply can result in serious injury or death.

eliminary Requirements.

(1) Remove lower panel (para 4-12).

(2) Remove junction box (para 4-28).



DE-ENERGIZED CHECK FOR CIRCUIT BETWEEN
A1 AND A2
B1 AND B2
C1 AND C2
TABLE A

DE-ENERGIZED CHECK FOR CONTINUITY BETWEEN
X1 AND X2
TABLE B

c. Removal.

(1) Twist turnbutton fasteners (1) and re (2).

(2) Tag and remove all wires from relay.

(3) Remove nuts (3) that secure relay (4)

d. Testing

(1) With relay de-energized, check for sh

With relay energized, check for continuity between terminals shown in Table C. If any open circuit is found, replace relay.

De-energize relay.

ion

Align holes in relay (4) with studs (5) in junction

Secure relay with nuts (3).

Install wires and remove tags.

Install front panel (2) and secure with turn-button fasteners (1).

Install lower panel (para 4-12).

ELAY RELAY (K3).

on.

delay relay is employed in the start circuit to dela
he refrigerant compressor for approximately 30 second
ary selector switch (S1) has been placed in the COOL
is allows the fan motor to start and come up to opera
the compressor starts, preventing a power overload

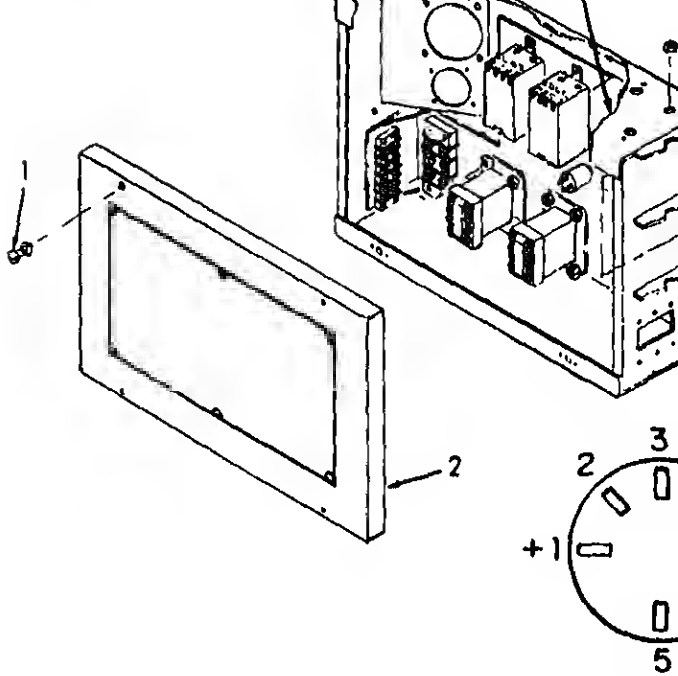
WARNING

careful when working with high voltage. Failure
comply can result in serious injury or death.

ry Requirements.

Remove lower panel (para 4-12).

Remove junction box (para 4-28).



WIRING

c. Removal.

Cover

(1) Twist Turn-button fasteners (1) an
(2).

d. Testing.

(1) Tag and disconnect wire V14B16 fro
wire V12B16 from TB2 terminal 2, a
relay K1 terminal X1.

(2) Check for short circuit between wi
Replace relay K3 if any short circ

(3) Reconnect wires disconnected in st
from wires

e. Removal.

Relay K3

(1) Tag and remove all wires from rela

lation

1) Align holes in relay (5) with holes in bracket (6).

2) Install relay using screws (4) and nuts (3).

3) Install wires and remove tags.

4) Install front panel (2) and secure with turn-button fastener (1).

5) Install lower panel (para 4-12).

AY ARMATURE (K4 & K5).

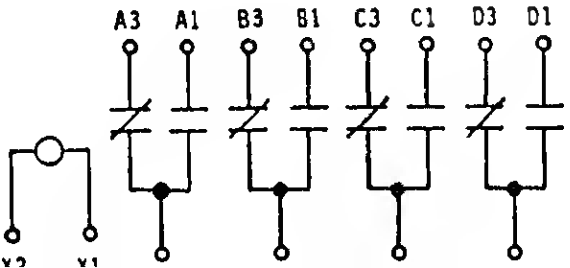
ɔtion.

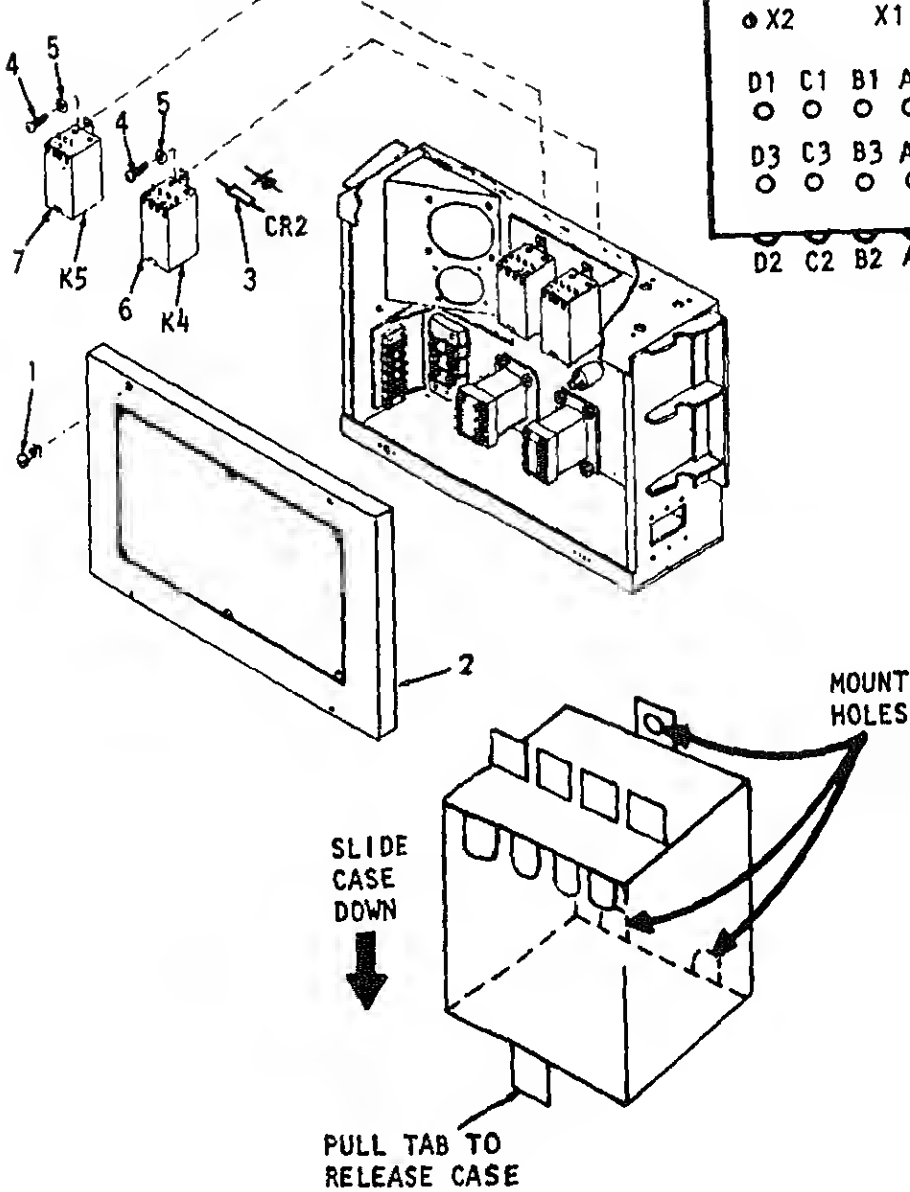
rmature relays (K4 and K5) control electrical power to th
ed for by the positioning of the two-speed fan switch.
an switch is in the LO-SPEED position, an increase in
discharge pressure to 400 (±16) psig will close the
ɔen pressure switch (S3) and cause the armature relay (K4
ɔlacing the fan motor in HI-SPEED. When the discharge
rops to 350 (±16) psig, the pressure switch (S3)
ill open, causing relay (K4) to open and the fan speed wi
LO-SPEED.

nary Requirements.

1) Remove lower panel (para 4-12).

2) Remove junction box (para 4-28).





DE-ENERGIZED CHECK FOR CONTINUITY
X1 AND X2
A2 AND A3
B2 AND B4
C2 AND C5
D2 AND D6

DE-ENERGIZED CHECK FOR SHORT CIRCUIT
A1 AND A2
B1 AND B2
C1 AND C2
D1 AND D2
X1 AND CASE

ENERGIZED CHECK FOR CONTINUITY
A1 AND A2
B1 AND B2
C1 AND C2
D1 AND D2

SH
A2
B2
C2
D2

) Tag and remove all wires from relay K4 or K5.

.

) With relay de-energized, check for continuity betw
terminals show in Table A. Replace relay if any
circuit is found.

) With relay de-energized, check for short circuit b
terminals shown in Table B. Replace relay if any
circuit is found.

) Energize relay coil between terminals X1 and X2 wi
28 ∓ 1 volt DC.

) With relay energized, check for continuity between
terminals shown in Table C. Replace relay if any
circuit is found.

) With relay energized, check for short circuit betw
terminals shown in Table D. Replace relay if any
circuit is found.

) De-energize relay.

.

y (K4 or K5)

) Tag and remove all wires from relay.

) Relay K4 - Remove diode CR2 (3).

) Remove screws (4), and washers (5).

) Remove relays (6 or 7).

ation.

) Align holes in relay (6 or 7) with holes in juncti
box.

) Install screws (4) and washers (5).

) Install diode (3) on relay K4. Refer to figure fo
orientation.

) Install wires and remove tags.

(6) Install lower panel (para 4-12).

4-35. TRANSFORMER (T1).

a. Description.

The transformer reduces the 208 vac input elect
(+3%) vac required by the rectifier. It is mounted
external panel of the junction box, adjacent to the

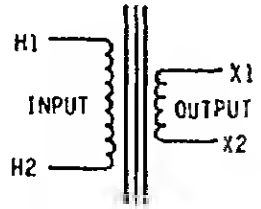
b. Preliminary Requirements

(1) Remove lower panel (para 4-12).

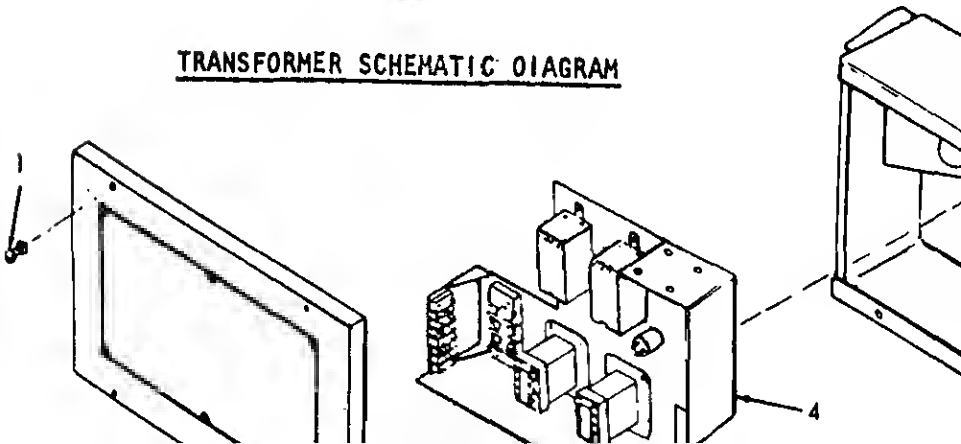
(2) Remove junction box (para 4-28).

WARNING

Be careful when working with high voltage.
to comply can result in serious injury or



TRANSFORMER SCHEMATIC DIAGRAM



(2).

Panel

(1) Remove screws (3) that attach panel (4) to junction

(2) Carefully pull the panel out of the junction box so access to the transformer base is obtained.

ormer

(1) Remove nuts (5).

(2) Raise transformer (6) to gain access to wiring.

(3) Tag and remove wires.

(4) Remove transformer (6) and gasket (7).

ng.

(1) Check for continuity between terminals H1 and H2. Replace transformer if any open circuit is found.

(2) Check for continuity between terminals X1 and X2. Replace transformer if an open circuit is found.

(3) Check for short circuit between terminals H1 and X1 Replace transformer if a short circuit is found.

(4) Check for short circuit between terminals H1 and th transformer case. Replace transformer if a short c cuit is found.

(5) Check for short circuit between terminals X1 and th transformer case. Replace transformer if a short circuit is found.

llation.

(1) Place gasket (7) on transformer (6).

(2) Install wires and remove tags.

(3) Place transformer and gasket on junction box.

(4) Install nuts (5).

(5) Carefully install the panel into the junction box.

(7) Install front panel (2) and secure wi
fasteners (1).

(8) Install junction box (para 4-28).

(9) Install lower panel (para 4-12).

4-36. TERMINAL BOARDS (TB1 & TB2).

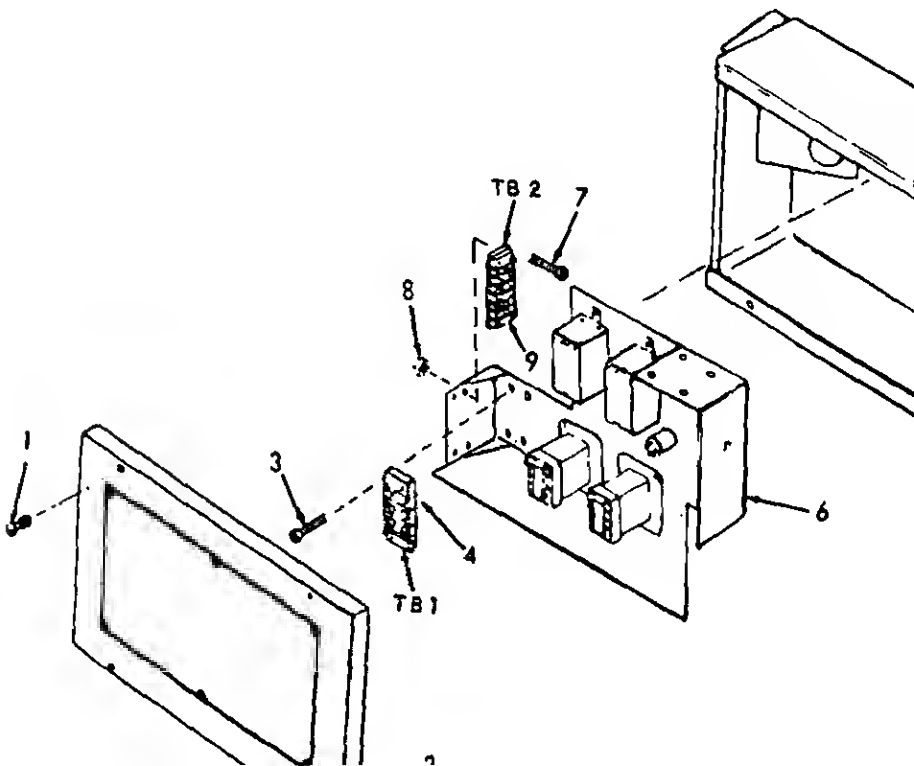
a. Description.

There are two terminal boards mounted in the l
of the junction box. Electrical power is distribut
terminal boards to all electrical components of the
All terminal boards are removed and installed in a

b. Preliminary Requirements.

(1) Remove Lower panel (para 4-12).

(2) Remove junction box (para 4-28) (for
only).



(2).

Tag and remove wires.

Remove screws (3).

Remove terminal board (4).

Tag and remove wires.

Remove screws (5) that attach panel (6) to junction box.

Carefully pull the panel out of the junction box so that access to TB-2 mounting nuts is obtained.

Remove nuts (8) and screws (7).

Remove terminal board (9).

n.

terminal boards for cracks, breaks, and damaged

ion.

Align terminal board (4) with holes in junction box.

Install screws (3).

Install wires and remove tags.

Align terminal board (9) with holes in junction box.

Install screws (7) and nuts (8).

Install wires and remove tags.

Carefully install the panel into the junction box.

(3) Install lower panel (para 4-12).

4-37. RECEPTACLES.

a. Preliminary Requirements.

(1) Remove lower panel (para 4-12).

(2) Remove junction box (para 4-28).

b. Inspection.

(1) Inspect for deformation, damaged threa
or broken wafers.

(2) Check continuity from each pin of the
terminal end of its asociated wire lea
should exist.

(3) Check continuity from each pin to the
connector. Continuity should not exis

(4) Replace the receptacles if they indica
continuity requirements are not met.

c. Replacement.

(1) Replacement is easily accomplished as
harness repair, refer to para 4-45.

4-38. RECTIFIER ASSEMBLY (CR1).

a. Description.

The rectifier is located on the center right si
box. It changes 30-volt alternating current to 30-v
for operation of the armature relays, compressor sta
delay relay and solenoid valves.

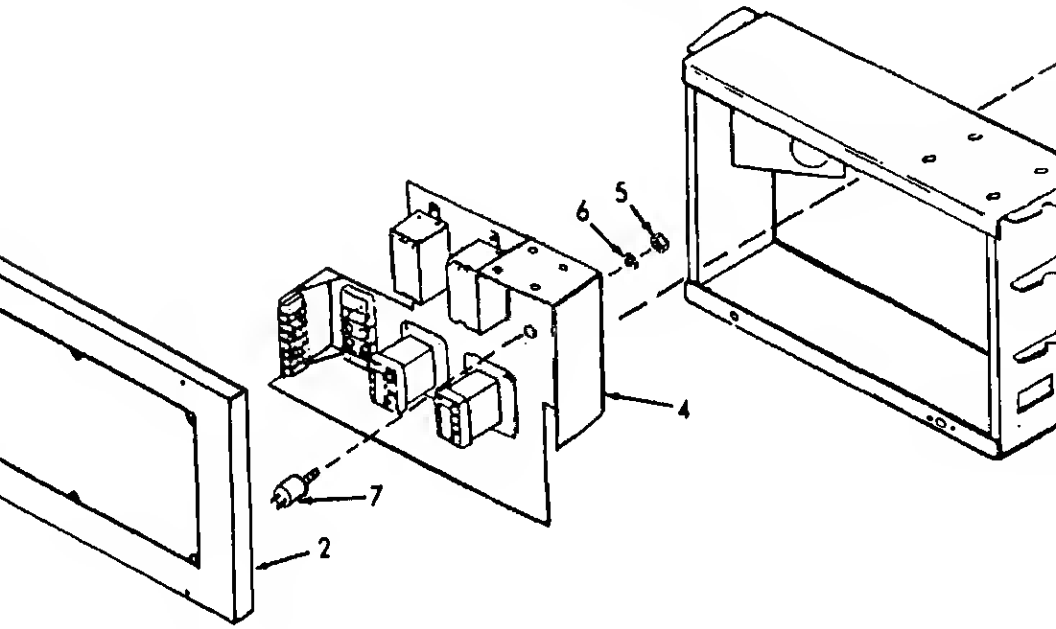
b. Preliminary Requirements.

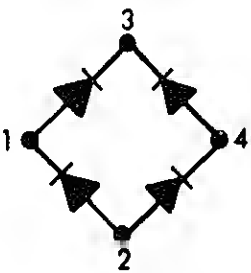
(1) Remove lower panel (para 4-12).

(2) Remove junction box (para 4-28).

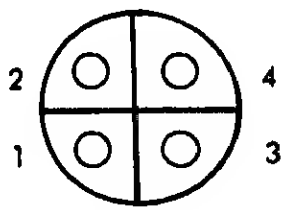
WARNING

Be careful when working with high voltage. Contact with high voltage can result in serious injury or death.





SCHEMATIC



RECTIFIER
WIRING VIEW

val.

Cover

(1) Tag and remove all wires from rectifier

(2) Using a multimeter test for continuity

Low Resistance	High Resistar
1 to 3	3 to 1
4 to 3	3 to 4
2 to 1	1 to 2
2 to 4	4 to 2

(3) Replace rectifier if found defective.

e. Removal.

CR1

(1) Remove screws (3) that attach panel (4) box.

(2) Carefully pull the panel out of the junct access to the back of the panel is obtai

(3) Remove nut (5) and washer (6).

(4) Remove rectifier (7).

f. Installation.

(1) Insert rectifier (7) in panel (4).

(2) Install washer (6) and nut (5).

(3) Carefully insert panel (4) into junction

(4) Secure panel (4) with screws (3).

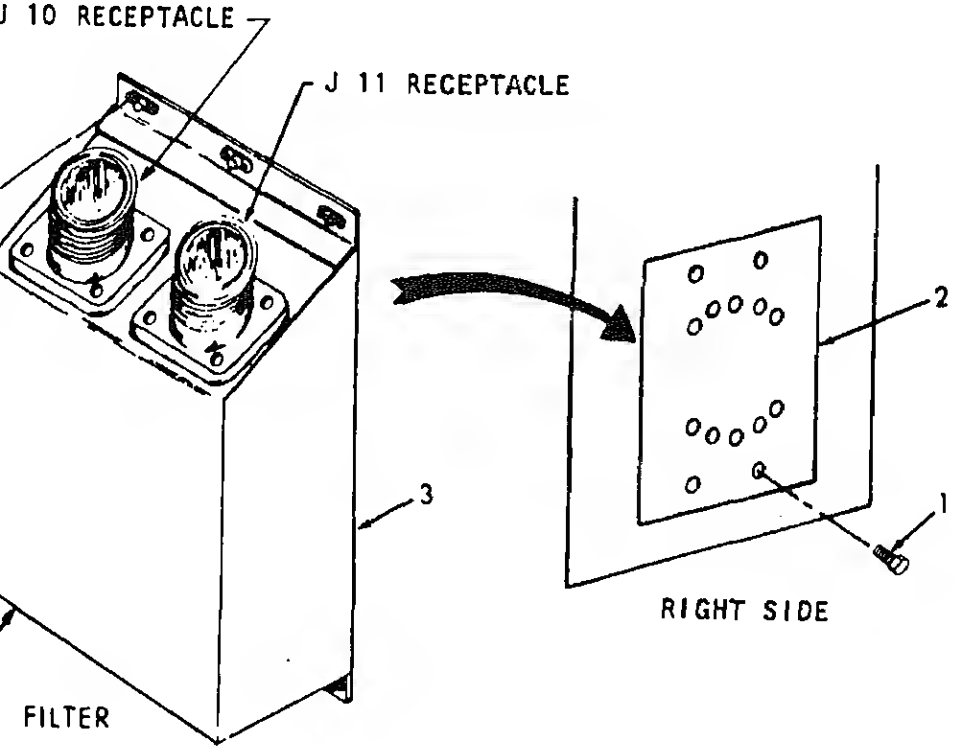
(5) Install front panel (2) and secure with t fasteners(1).

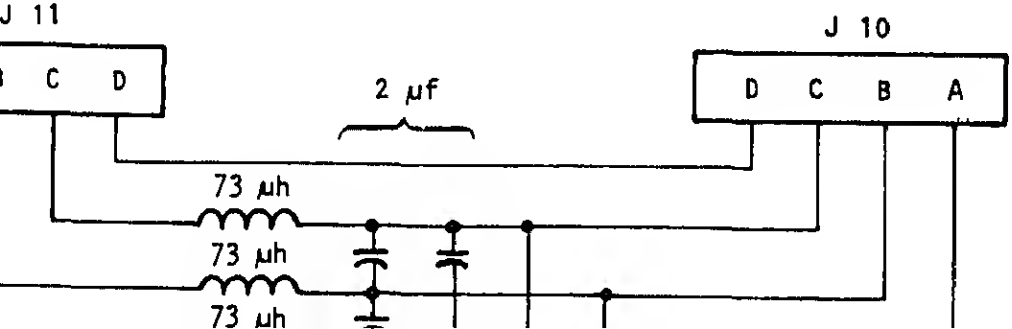
(6) Install junction box (para 4-28).

(7) Install lower panel (para 4-12).

tion.

sion of radio frequency interference (RFI) is attaine
low-resistance path to ground for stray currents. T
d include shielding the ignition and high-frequency w
he frame with bonding straps, and using capacitors an
The air conditioner's RFI filter consists of a 73 uH
ies with each phase, and capacitors between phases an
h phase and ground.





The voltage used can be lethal.

b. Removal.

(1) Remove screws (1) from the filter m

(2) Pull the filter housing (3) and mou outward as far as possible, and dis plugs, P10 and P11, from receptacle filter housing.

(3) Remove screws (4) near the top and mounting plate to release the filte Separate the housing from the mount

c. Inspection.

(1) Inspect the housing and mounting pl damage such as dents, punctures or

(2) Look for evidence of overheating, o potting compound, arcing at termina

(3) Check continuity between connector the following table.

From receptacle J10, pin	To receptacle J11, pin
A	A
A	B
A	C
A	D
B	B
B	C
B	D
C	C
C	D
D	D

good, and replace the defective RFI Filter Assembly.

allation

(1) Position the filter housing (3) on the mounting (2) using screws (4).

(2) Install connectors P10 and P11.

(3) Install mounting plate (2) using screws (1).

MPRESSOR

refrigeration compressor is a self-contained unit whi ates a reciprocating compressor, a drive motor and a l f oil hermetically sealed into a dome-shaped steel hou ce type crankcase heater is mounted around the outside or housing near the base. Organizational Maintenance ted to testing of compressor and testing and replacing kcase heater.

COMPRESSOR TEST

WARNING

Disconnect power from the air conditioner before performing maintenance on the electrical system. The voltage used can be lethal.

iminary Requirements

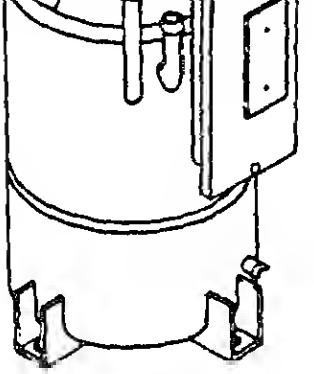
Remove junction box (para 4-28).

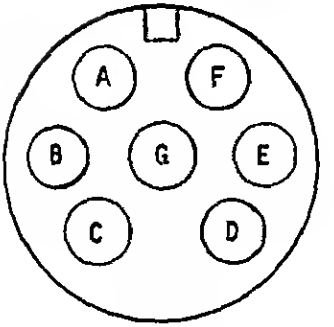
ial Tools.

timeter

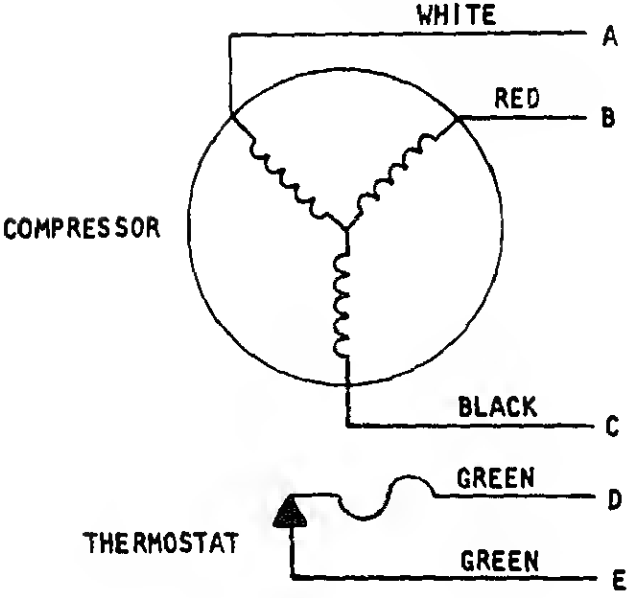
val.

To gain access to the compressor the harnesses to the junction box may be removed.




A
F
B
G
E
C
D

PIN SIDE
J 4


WHITE
A
RED
B
COMPRESSOR
BLACK
C
GREEN
D
THERMOSTAT
GREEN
E
F
CRANK CASE

2) If mounting bolts are loose, tighten them. If electrical trouble is indicated, check continuity follows:

3) Disconnect plug, P4, from the electrical junction on the compressor.

4) Using a multimeter check for continuity on recept J4.

Compressor Motor

A to B
B to C
A to C

Thermal Overload

D to E

Crankcase Heater

F to G

5) Using a multimeter check for a lack of continuity between receptacle J4 and compressor housing. A, D, and housing.

6) If there is no continuity between F and G, replac crankcase heater.

7) If the continuity requirements are not met for A, and C or D and E, refer to Direct Support Mainten

.

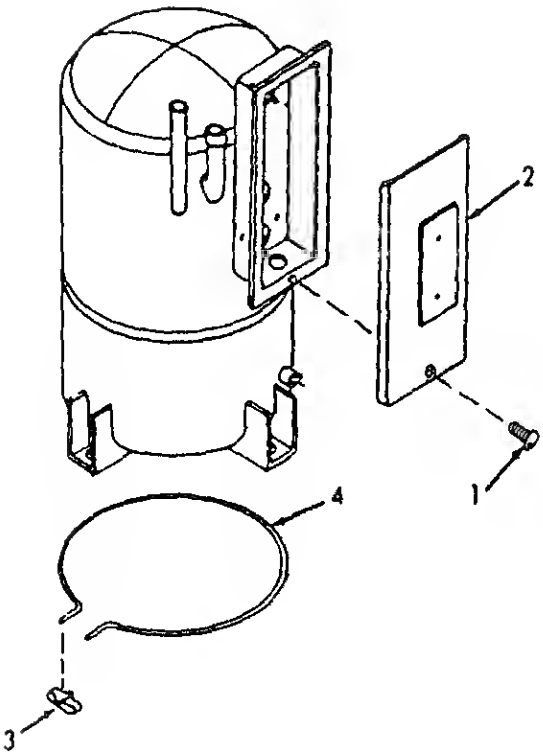
ir is limited to crankcase heater only (para 4-40.2).

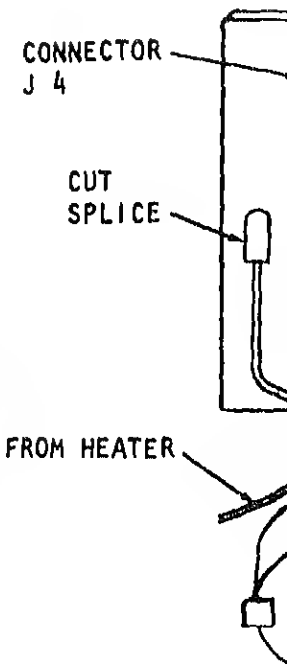
ANKCASE HEATER.

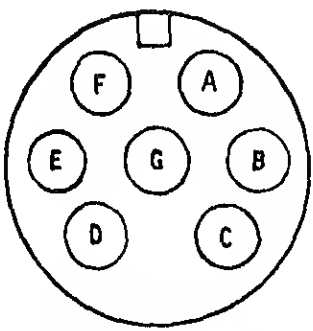
ption.

esistance type crankcase heater is mounted around the mpressor housing near the base. The purpose of the cr er is to prevent migration of liquid refrigerant into in cold weather. Liquid refrigerant could mix with ng the oil to be pumped throughout the system.

(2) Remove junction box (para 4-28).







c. Removal.

(1) Remove screw (1) then compressor j
(2).

it.

tion or Test.

1) Inspect heating element for damage.

2) Test heating element as per para 4-40.2.

lation.

1) Maneuver the crankcase heating element (4) over t of the compressor, and down to the lower part of compressor housing. Do not spread the ends of th heating element any more than necessary. Install retaining spring (3) over both ends of the heatin element (4) to hold it in position.

2) Lead electrical wires from heating element (4) in compressor junction box. Slide a one-inch length heat-shrink tubing over one wire lead, and solder to pin G of receptacle with solder (item 12, tabl Slide heat-shrink tubing over connection, and hea a match to shrink in place. Splice the other hea lead to the thermostat lead and insulate as neces

3) Install cover (2) on junction box using screw (1)

4) Install plug P4.

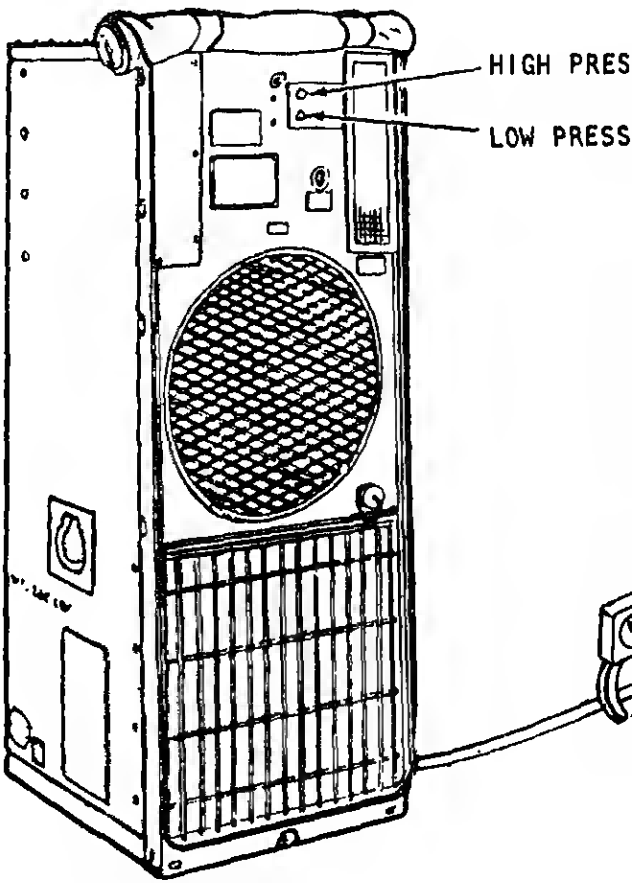
5) Install junction box (para 4-28).

6) Install lower panel (para 4-12).

SSURE SWITCHES.

pressure switches are of two types, a high/low pressur and a pressure control switch. Organizational Mainte mited to testing of the pressure switches, for replac to Direct Support Maintenance in Chapter 5.

The high-pressure and the low-pressure cutout
tective devices which interrupt electrical power t
whenever refrigerant system pressure becomes too h
permit safe, efficient operation. The pressure co
switches are made by means of capillary tubes to t
and suction side of the compressor. Electrically,
are connected in series between the rotary selecto
pressor. Both switches are equipped with manual r
pressure cutout switches are located next to the f
screen on the back of the air conditioner.



b. Test.

Check electrical operation of the pressure cu
following manner.

reading should drop when each reset button is p
and return to its original reading when the butt
released.

(3) If the ammeter does not respond when each buttor
pressed and released, refer to Direct Support Ma
ance for replacement.

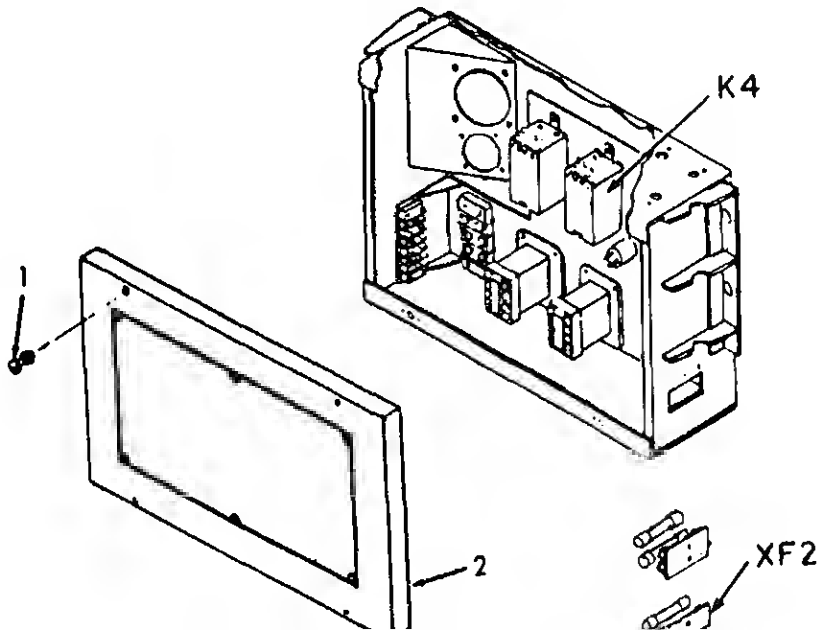
PRESSURE CONTROL SWITCH (FAN SPEED).

scription.

he pressure switch (fan speed) is installed to sense con
rge pressure. When the air conditioner is operated with
switch in the LO-SPEED position, an increase in compress
rge pressure to 400 (±16) psig (281.2 ±11.2 kg cm^2)will
rmally open pressure switch (S3), causing the switch to
e fan speed to increase to HI-SPEED. When the discharge
rops to 350 (±16) psig, (246.1 ±10.5 kg cm^2) the pressur
(S3) contacts will return to normally open and the fan
eturn to LO-SPEED.

eliminary Requirements.

Remove lower panel (para 4-12).



Check for continuity between terminals 2
(XF2) and X2 of armature relay (K4). Co
should not be indicated. If continuity
switch is defective and must be replaced

e. Replacement.

Refer to Direct Support Maintenance for pressure
replacement.

4-42. REFRIGERANT COMPONENTS.

The refrigerant components limited to Organizatio
consist of two solenoid valves that can be tested and
coils replaced. Inspection of the sight glass is requ
addition there is servicing of the condenser coil and
coil.

4-42.1 LIQUID LINE SOLENOID VALVE L1.

a. Description.

The liquid line solenoid valve is used to close/o
refrigerant line from the condenser coil to the evapor
expansion valve. The liquid line solenoid valve is lo
behind the filter-drier in the lower part of the unit

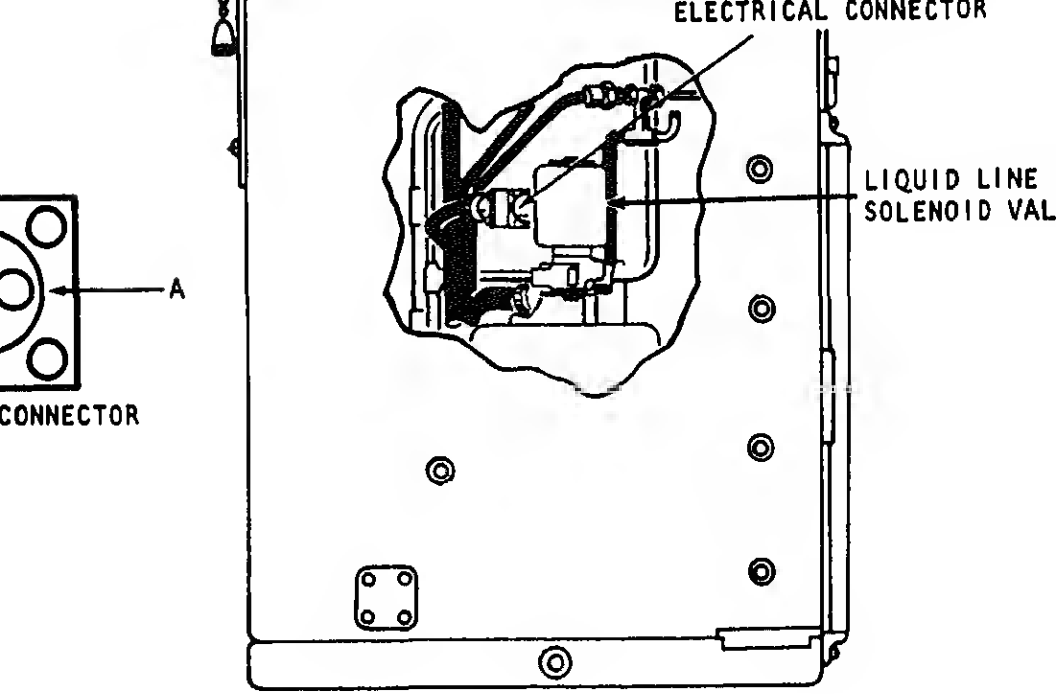
NOTE

A source of 24 to 28 vdc is required to perf
following test.

b. Preliminary Requirements.

(1) Removal of lower panel (para 4-12).

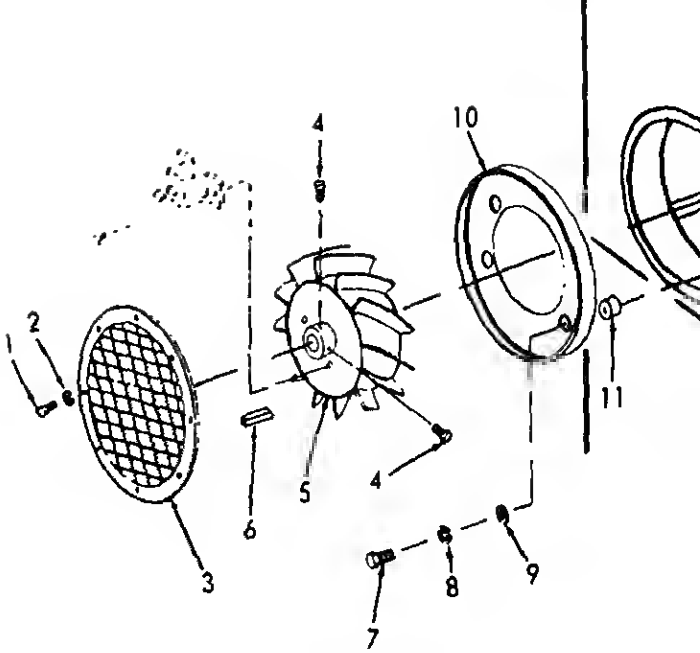
(2) Removal of junction box (para 4-28).



) Inspect the solenoid valve visually for physical damage, loose connectors, loose coil and housing and broken or frayed wires or missing insulation.

) Test operation by applying 24-28 volts dc to the pins & B of the electrical connector, and listening for a sharp click which indicates that the solenoid plunger working properly.

) If damage is evident or solenoid plunger fails to ope ate, replace the coil assembly. If valve still does operate properly, as indicated by pressure testing or troubleshooting, refer to Direct Support Maintenance replacement of the diaphram or the entire valve.



d. Removal.

(1) Disconnect wiring harness plug fro

(2) Remove screws (1) and lockwashers fan guard (3) to housing.

(3) Remove condenser fan guard.

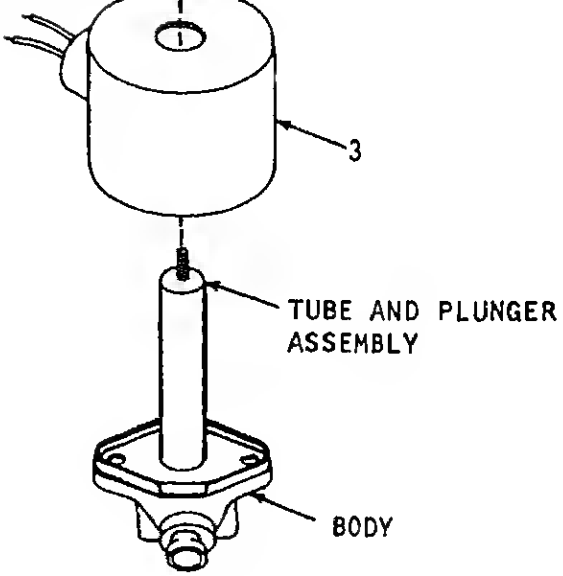
(4) Remove set screws (4).

(5) Using a wheel puller install two 1/ bolts in evenly.

(6) Remove condenser fan (5) and key (

(7) Remove screws (7), lockwashers (8), that attach baffle (10) and bushing

(8) The top nut on the solenoid valve left side.



enoid Valve Disassembly

Remove nut (1) and data plate (2) from top of coil
(3) and lift off coil assembly.

tallation.of Coil.

electrical connector is serviceable, transfer it to
y, and install the coil assembly on the solenoid valv
:

(1) Place coil assembly (3) over tube and plunger
and position data plate (2) on coil assembly.
with nut (1).

(2) Retest plunger operation by applying 24-28 vol
pins A and B of receptacle. If no click is he
refer to Direct Support Maintenance for replac
the tube and plunger assembly, diaphram and O-
the valve body.

(3) If a click is heard when 24-28 volts dc is app
the solenoid coil, connect the wiring harness
plug.

(4) Install baffle (10) and bushings (11) lockwashers (8) and washers (9).

CAUTION

Do not hammer the impeller onto the motor The motor bearings would be damaged. If d is encountered, dress out rough spots on t with a fine file, stone or abrasive cloth. coating of light oil to ease assembly.

(5) Align key ways in shaft and impeller, inst press impeller (5) onto shaft. The end of the motor even with the face of the hub when the impeller is c position. Tighten setscrews (4) finger tight. Star keyway setscrew, tighten to a final torque of 78-82 (8.87 - 9.33 newton-meters).

NOTE

In order to direct the condenser exhaust u away from the intake, the condenser fan gu designed so that it can be installed in on way. All screw holes must match to permit installation.

(6) Install condenser fan guard (3) with screw washers (2).

4-42.2 PRESSURE EQUALIZER SOLENOID VALVE.

a. Description.

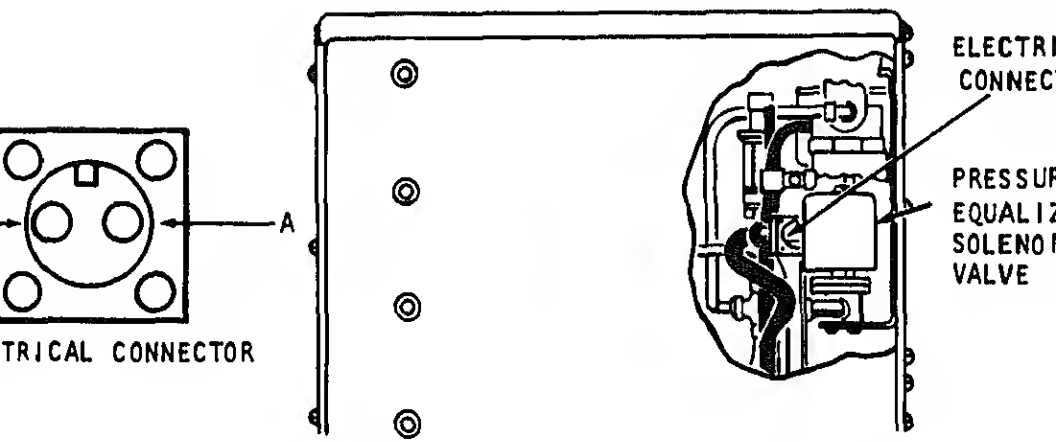
The pressure equalizer solenoid valve is used t pressure equalization circuit from the discharge sid pressor to the suction side. The pressure equalizer is located in the upper rear part of the air conditi

NOTE

A source of 24 to 28 vdc is required to pe following test.

(2) Removal of top panel (para 4-9).

NOTE: TAG AND DISCONNECT ELECTRICAL LEADS AS NECESSARY.



st.

(1) Inspect the solenoid valve visually for physical
damage, loose connectors, loose coil and housing
broken or frayed wires or missing insulation.

(2) Test operation by applying 24-28 volts dc to the
& B of the electrical connector, and listening fo
sharp click which indicates that the solenoid plu
working properly.

(3) If damage is evident or solenoid plunger fails to
ate, replace the coil assembly. If valve still d
operate properly, as indicated by pressure testin
troubleshooting, refer to Direct Support Maintena
replacement of the diaphram or the entire valve.

(1) Disconnect wiring harness plug from rec

(2) Remove screws that attach pressure cut- to frame.

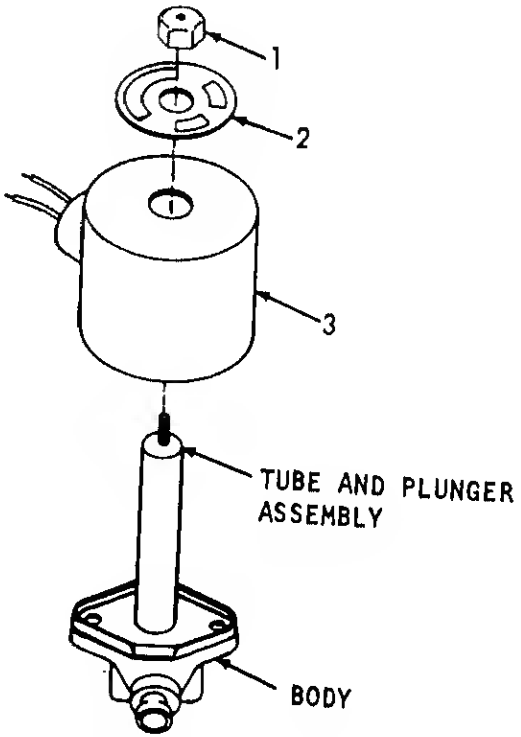
CAUTION

Carefully move pressure cut-out switch box access. Capillary tubes may be damaged.

(3) Move pressure cut-out switch box.

(4) Access is now available to top nut of so

e. Solenoid Valve Disassembly



Remove nut (1) and data plate (2) from top of c (3) and lift off coil assembly.

f. Installation of Coil.

refer to Direct Support Maintenance for replaceme
the tube and plunger assembly, diaphram and O-rin
the valve body.

(3) If a click is heard when 24-28 volts dc is applie
the solenoid coil, connect the wiring harness ele
plug.

al Installation

CAUTION

Carefully move pressure cut-out switch box when reas-
sembling. Capillary tubes may be damaged.

(1) Relocate pressure cut-out switch box to holes in
panel and attach with screws.

(2) Attach wiring harness plug to solenoid valve.

(3) Install top panel (para 4-9).

(4) Install canvas cover (para 4-8).

SIGHT GLASS.

cription.

e sight-glass liquid indicator is a circular sealed windo
uid side of the system between the liquid line solenoid v
evaporator coil expansion valve. The indicator is locat
surface of the air conditioner, below the pressure cuto
.

ection.

sually inspect the sight-glass liquid indicator for physi
cracked or broken sight-glass or similar defects.

acement.

fer to Direct Support Maintenance.

The condenser coil assembly consists of two c
set of fins: the condenser coil itself, and the su
(See Refrigeration Diagram, figure 5-1). The cond
is located at the bottom rear section of the air c
covered by a condenser coil guard and screen assem
from damage and dirt.

b. Preliminary Requirements.

(1) Remove canvas cover (para 4-8).

(2) Remove condenser coil guard (para 4-1

c. Servicing.

Remove all dust and dirt by using eit
or by brushing.

d. Replacement.

(1) Replace the condenser coil guard (para

(2) Replace canvas cover (para 4-8).

4-42.5 EVAPORATOR COIL.

a. Description.

The evaporation coil receives liquid refrigera
sion valve, and evaporates the liquid to a gas by ab
the air flow passing over the outside surface of the
evaporator coil is located in the top front section
conditioner.

b. Preliminary Requirements.

(1) Remove canvas cover (para 4-8).

(2) Remove top panel (para 4-9).

(3) Remove air discharge grille (para 4-10)

(4) Remove mist eliminator (para 4-20).

c. Servicing.

Remove all dust and dirt by using either comp
brushing.

3) Replace top panel (para 4-9).

4) Replace canvas cover (para 4-8).

TER.

aintenance of the heater consists of testing and replacer
ter elements and thermostat.

ATER ELEMENTS.

otion.

ix steel sheathed resistance heating elements are located
y behind the evaporator coil, and extend all the way acro
of the air conditioner. Three of the elements are energi
otary selector switch is set at LO HEAT, and all six
re energized when the rotary selector switch is set at HI
temperature control thermostat controls only the element
by the LO HEAT setting. All six elements are protected
erheating by a thermal overload protector (heater therost

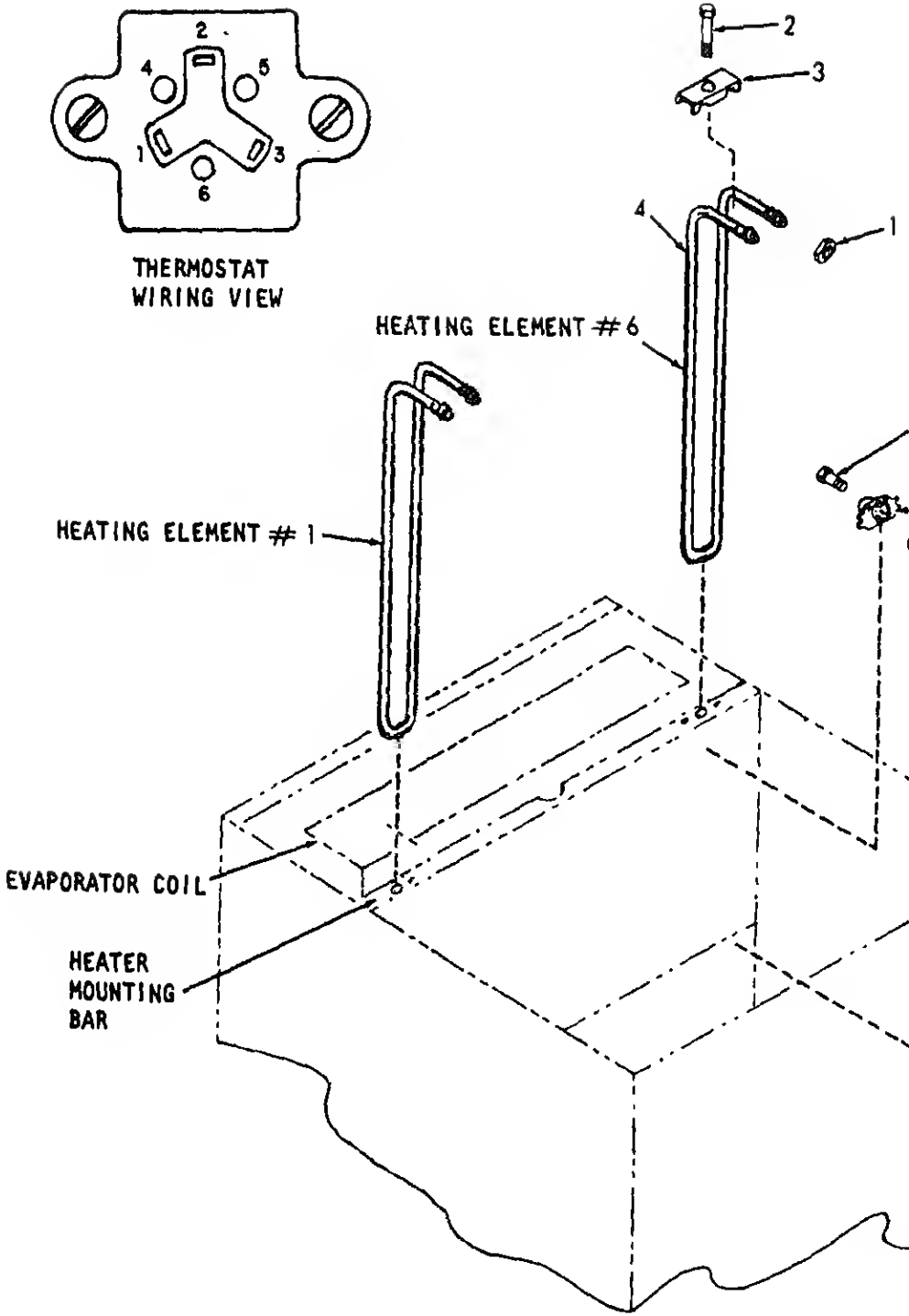
WARNING

Disconnect power from the air conditioner before
performing maintenance on the electrical system.
The voltage used can be lethal.

nary Requirements.

1) Remove canvas cover (para 4-8).

2) Remove top panel (para 4-9).


2
4
5
1
3
6
THERMOSTAT
WIRING VIEW
2
3
4
1
HEATING ELEMENT # 6
HEATING ELEMENT # 1
EVAPORATOR COIL
HEATER
MOUNTING
BAR

ntinuity testing of each element can be performed this time if further disassembly is not required.

Unscrew the panel fastener screw (2) in each hold-down clamp (3) and remove the clamp. Pull heating element (4) straight up to remove.

on/Test.

Visually inspect each heating element for damage, deformation, damaged terminal threads, cracked or brok sheath, or burnt-out spots. If damaged, replace.

Using an ohmmeter, multimeter or other continuity tester, check continuity of each heating element. Replace elements that do not indicate continuity.

ly.

Insert each heating element (4) down between the heate mounting bar and the evaporator coil, with each mounti arm equidistant from the panel fastener screw hole.

Place hold-down clamp (3) over both mounting arms, and secure with the panel fastener screw (2).

Make proper wiring connections. (See wiring diagram, figure FO-1).

Replace top panel (para 4-9).

Replace canvas cover (para 4-8).

ER THERMOSTAT.

ion.

ter thermostat is a thermal overload protector, located etween the heating elements. It is electrically connect ng elements in such a way that if temperature exceeds a um, the heater thermostat opens the circuits. When the nas returned to normal, the thermostat automatically eby closing the ciruits to the heating elements.

The voltage used can be lethal.

b. Special Tool Required.

Multimeter

c. Preliminary Requirements.

(1) Remove canvas cover (para 4-8).

(2) Remove top panel (para 4-9).

d. Removal.

NOTE

If desired, heating elements 5 and 6 may b
for better access for removal of the therm
attaching hardware.

(1) Tag and disconnect wire leads from the
(4) to the heater thermostat (5).

(2) Remove two screws (6) and self-locking
the heater thermostat (5). Remove the

e. Inspection/Test

(1) Visually inspect the heater thermostat
housing, missing pieces or other damag
damaged.

(2) Using an ohmmeter or other continuity t
continuity of the wire leads attached t
5-6, and 4-6 of the heater thermostat.
is not indicated, replace heater therm

f. Replacement.

(1) Place the body of the heater thermostat
mounting hole of the heater assembly su
with two screws (6) and self-locking nu

NOTE

If two heating elements were removed for co
replace them at this time.

) Replace top panel (para 4-9).

) Replace canvas cover (para 4-8).

AND MOTOR.

aporator fan is located on one end of a double-shafted
otor. Located on the other end of the motor is a conder
e following paragraphs each fan is removed and then the

PORATOR FAN.

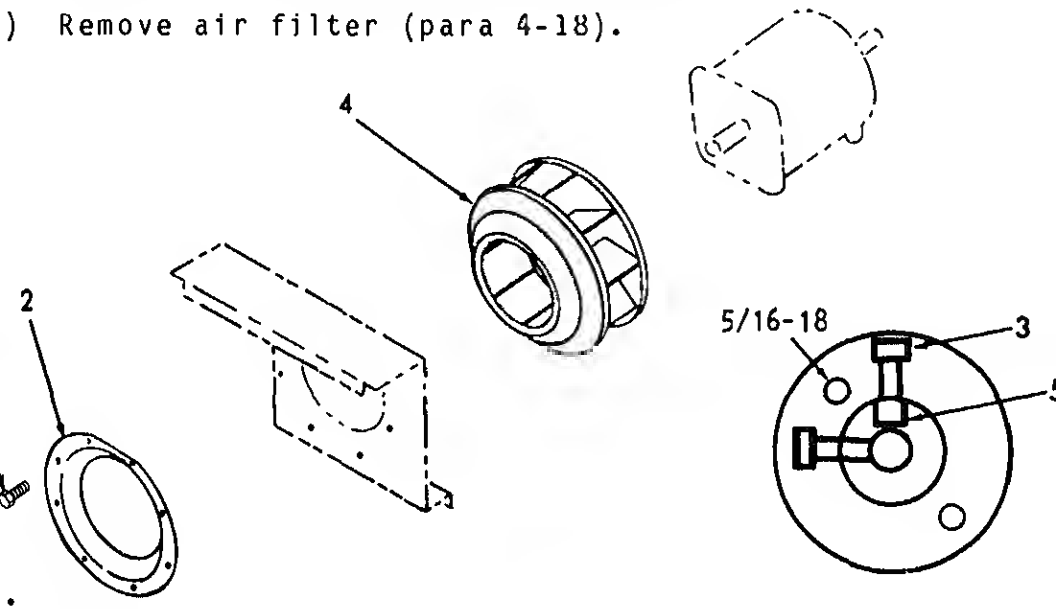
tion.

aporator fan is located behind the evaporator intake gri
filter. The fan is driven by a double-shafted two-spee
consists of a centrifugal impeller and an inlet ring.
m the evaporator fan is directed upward into the space
heating elements and evaporator coil, and is discharged
se components before passing out through the evaporator
rille.

nary Procedures.

) Remove air intake grille (para 4-11).

) Remove air filter (para 4-18).



) Remove screws (1) that attach the inlet ring (2) to t
panel.

both in equal increments until impel

(4) Remove evaporator fan (4) and key (5

d. Inspection.

(1) Inspect the inlet ring for nicks, de ation or evidence of rubbing. Repla damaged.

(2) Inspect the impeller for gouges, def of rubbing, or broken welds. Replac damaged.

e. Replacement.

CAUTION

Do not hammer the impeller onto the moto The motor bearings would be damaged. Ir difficulty, dress out rough spots on the a fine file, stone or abrasive cloth. A ing of light oil to ease assembly.

(1) Place key (5) in the shaft keyway, a impeller (4) on the shaft. The end be even with the face of the hub.

(2) Tighten the setscrews (3) over the k tight, then tighten the remaining se both setscrews to a final torque of (8.87 - 9.33 newton meters).

(3) Position the inlet ring (2) flat edg circular fan opening. Secure with e Rotate the impeller by hand to be su exists. Adjust inlet ring if necess

(4) Replace the air filter (para 4-18).

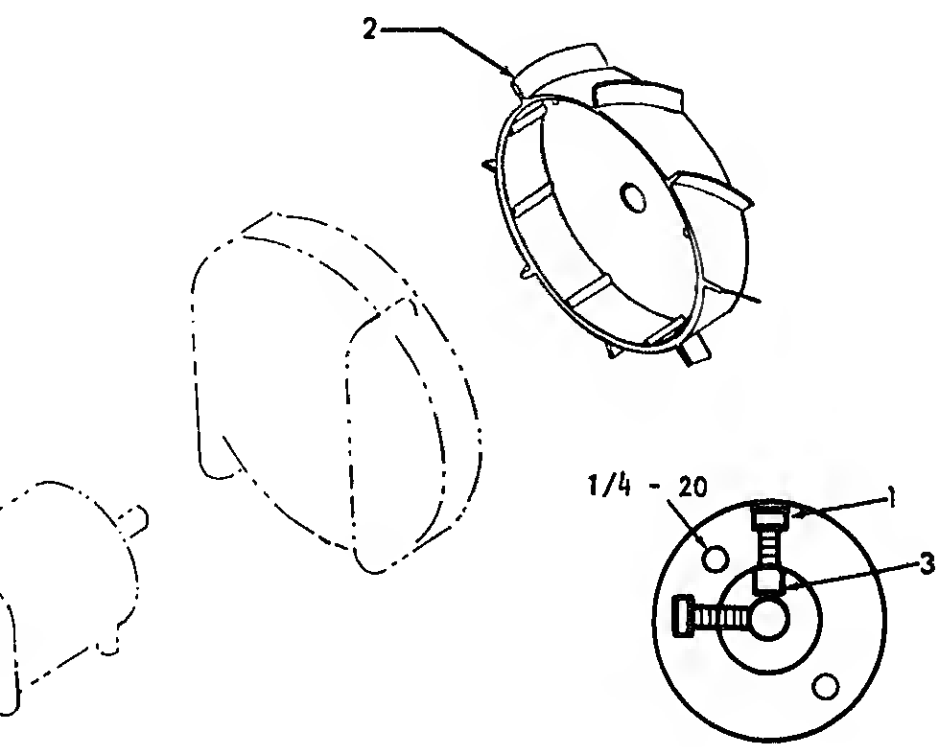
(5) Replace the air intake grille (para

ndenser fan is located behind the circular fan guard on
the air conditioner. The fan is driven by one end of a
ted two-speed motor. It consists of an aluminum axial
ich rotates within a shroud which is part of the motor
ir is drawn into the lower chamber through the conden-
nd is exhausted through the fan guard.

nary Requirements.

) Remove canvas cover (para 4-8).

) Remove condenser fan guard (para 4-16).



) Loosen two setscrews (1) in the hub of the fan impell
(2) and pull the impeller off the motor shaft.

) Remove key (3).

NOTE

b. Replacement.

CAUTION

Do not hammer the impeller onto the motor
The motor bearings would be damaged. If
is encountered, dress out rough spots on
with a fine file, stone or abrasive cloth
coating of light oil to ease assembly.

(1) Align keyways in shaft and impeller,
and press impeller (2) onto shaft. T
shaft should be even with the face of
impeller is completely in position.
(1) finger tight. Starting with the
tighten to a final torque of 78-82 po
9.33 newton-meters).

NOTE

In order to direct the condenser exhaust
away from the intake, the condenser fan g
designed so that it can be installed in o
way. All screw holes must match to permi
installation.

(2) Replace the condenser fan guard (para

(3) Replace canvas cover (para 4-8).

4-44.3 FAN MOTOR.

a. Description.

The fan motor is double shafted to drive the e
impeller at one end, and the condenser fan impeller
The motor contains two sets of windings, which perm
operation. The speed, using one set of windings, i
When the second set of windings is switched on, the
to 3450 rpm. The motor contains permanently lubric
bearings, and is protected against overheating by a
protector.

Disconnect power from the air conditioner before performing maintenance work on the electrical syste The voltage used can be lethal.

reliminary Requirements.

(1) Remove canvas cover (para 4-8)

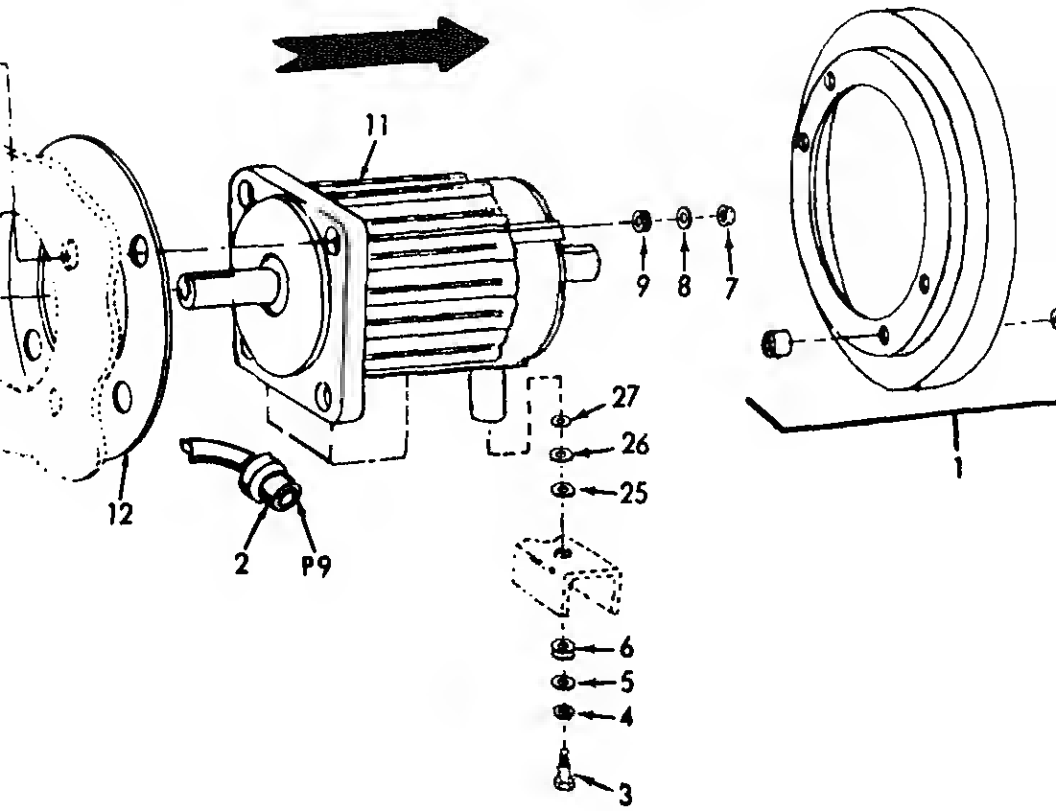
(2) Remove air intake grille (para 4-11).

(3) Remove air filter (para 4-18).

(4) Remove condenser fan guard (para 4-16).

(5) Remove evaporator fan assembly (para 4-44.1).

(6) Remove condenser fan assembly (para 4-44.2).



(2) Disconnect wiring harness plug, P9 (
receptacle, J9, on the motor junctio

(3) Carefully remove two socket head cap
washers (4), flat washers (5), and bu
secure the motor mounting feet to the

(4) Remove four self-locking nuts (7), fl
bushings (9), and flat-head screws (1
of the motor mounting flange (11).

(5) Carefully withdraw the motor (11) car
exercised so that the rubber ring (12

d. Inspection/Test.

(1) Spin the rotor (13) and listen for bea
indicating rough operation. If preser
slowly backward and forward by hand to
Replace bearings if roughness is evide

(2) Grip the rotor shaft, and attempt to p
to check for end-play. If there is, r
or shim(s).

(3) Using an ohmmeter or other continuity
check continuity between connector pin
D-F, and between G-H, H-J and G-J. Co
indicated. Also check to be sure that
exists between each pin and the motor
If continuity requirements are not met,
motor.

e. Disassembly.

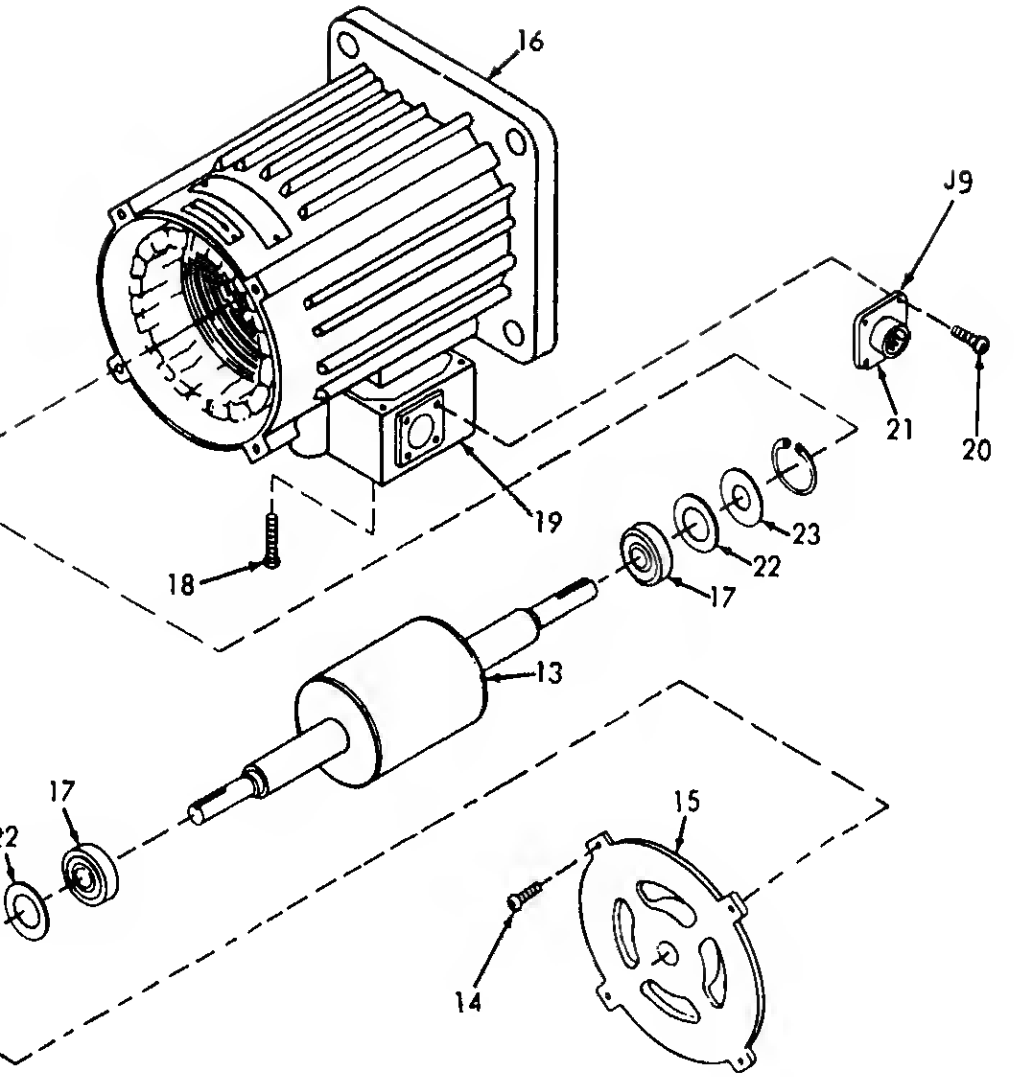
Disassemble the motor only to the extent necessa
repairs.

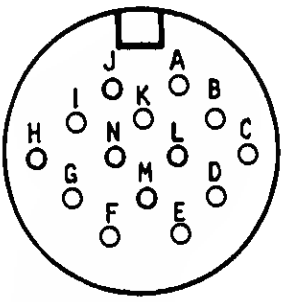
(1) Remove four screws (14) and the end pla

CAUTION

Keep load spring, shims and washers in their
relationships at disassembly, they will be n
at assembly.

(2) Withdraw the rotor (13)





CONNECTOR J9
PIN VIEW

(5) Tag wires for identification, and uns
connector.

(6) Remove four screws from corners of co
and remove connector (21) from juncti

f. Cleaning.

WARNING

Dry cleaning solvent P-D-680 (item 3, tab
used to clean parts is potentially danger
personnel and property. Do not use near
or excessive heat. Flash point of solven
to 138°F (38°C to 59°C).

CAUTION

Bearings are permanently lubricated and s
the time of manufacture. Do not attempt
or relubricate them. Keep bearings in pl
or wrap securely in grease-proof paper un
for assembly.

Blow loose dirt from cavities and windings. W
faces with a cloth moistened with dry cleaning solv
E-1).

g. Reassembly (Motor).

(1) Pull wires through connector hole in
and solder them to their respective c
(See wiring diagram, figure FO-1, for
connections).

(2) Install receptacle (21) in junction b
with four screws (20).

(3) Position junction box (19) on motor f
secure with four screws (18) through

bearing into the bearing recess in the stator.

) Place a bearing (17), shim (22) and load spring (24), that order, over the longer shaft of the rotor (13). Carefully fit end-plate (15) over the assembly, guidi the bearing into the bearing recess.

) Secure the end plate (15) to the stator (16) with fou screws (14), tightened uniformly in increments. Attempt to turn shaft by hand. If shaft does not tur freely, check assembly of end plate on stator, and adjust if necessary.

ation.

) Position the flange end of the motor (11) against the partition. Install four flat-head screws (10) throug the inlet fan ring (12) and the partition and the hol in the corners for the motor's mounting flange. Plac a bushing (9), a washer (8) and a self-locking nut (7 on each screw, and tighten finger-tight.

NOTE

rial-fit resilient washers of the same thickness at irst, then replace with different sizes if necessary o center impellers.

) Place a lock washer (4), flat washer (5), and bushing (6) (flange end toward bolt head) on a socket-head shoulder bolt (3) and partially insert bolt into hole cross-bar. On top of cross-bar, place a resilient washer (25), large flat washer (26), and small flat washer (27) between the cross-bar and the motor mount foot. Push bolt and bushing up through the resilient washer, and screw bolt into the motor mounting foot. Repeat assembly in the same order for the other mount foot. Tighten both bolts uniformly, and check for co centricity of impellers and openings.

Adjust by replacing resilient washers with those of a different thickness, as required. When satisfactory, tighten all mounting bolts, including the four bolts nuts in the corners of the flange.

) Connect wiring harness plug, P9, to the receptacle on the motor's junction box. Temporarily connect pow to the air conditioner, and turn mode selector switch

(5) Replace condenser fan assembly (para

(6) Replace condenser fan guard (para 4-1

(7) Replace evaporator fan assembly (4-44.

(8) Replace air filter (para 4-18).

(9) Replace air intake grille (para 4-11).

(10) Replace Canvas cover (para 4-8).

4-45. WIRE LEADS AND WIRING HARNESS.

Preferred repair methods consist of replacing w connectors, etc. rather than splicing wires, bending terminals, and other make-shift procedures, althoug appropriate for emergency field repairs. Determine and length of wire, terminal or connector to be use by referring to Table 4-3, Wire List, and to the wi (figure FO-1).

a. Soldering Connections. Wire connections mus ically sound before they are soldered; solder alone sufficient strength to prevent breakage. Joining su tions to be soldered must be clean and bright. If a used, it should conform to Specification MIL-F-4995, alcohol flux, and should be brushed onto the joint b If a flux-core solder is used, it should always be r ical solder. If an uncored solder is used, it shou solder (item 12, table E-1). Wires should always be point at which the solder will melt completely and f of the joint. Excessive build-up of solder "gobs" c be avoided or removed.

b. Insulating Joints. The preferred method of trical joints is by the use of heat-shrink tubing. piece of heat-shrink tubing of suitable diameter to for covering joints at terminals or connectors, or t 1.2-inch longer than the joint to be insulated, and over the wire before making the joint. After the jo the tubing over the joint, and shrink in place with

three turns. Solder and apply heat-shrink tubing and he
bed above.

Crimping Terminals. To install a terminal on the end o
1/4 to 1/2 inch of insulation from the end of the wire,
ch piece of heat-shrink tubing (if the terminals are of
lated type), and insert wire-end into the shank of the t
the shank, and install heat-shrink tubing if necessary.

Table 4-3. Wire List

No.	FROM Terminal Type	FROM Term. No.	TO Terminal Type	TO Term. No.	Length (Inches)
	Wiring Harness — Control Module				
8N	MS3102R28-11P	J7-A	MS25036-108	E2	3
B	MS3102R28-11P	J7-M	Both in	S1-41	8
B	13211E8288	S1-31	13211E8288	S1-41	2.82
	13211E8288	J7-X	Both in	S1-11	10
	13211E8288	S1-11	MS25036-153	S2-1	8.5
	MS3102R28-11P	J7-W	13211E8288	S1-10	10
C	MS3102R28-11P	J7-K	13211E8288	S1-4	9
8	MS3102R28-11P	J7-N	13211E8288	S1-1A	11
A	MS3102R28-11P	J7-J	Both in	S1-22	10.37
A	13211E8288	S1-32	13211E8288	S1-22	1.75
8	MS3102R28-11P	J7-T	13211E8288	S1-1B	11
A	MS3102R28-11P	J7-I	13211E8288	S1-2B	10.37
6A	MS3102R28-11P	J7-C	13211E8288	S1-2C	9.37
A	MS3102R28-11P	J7-V	13211E8288	S1-3A	9,82
6B	MS3102R28-11P	J7-U	13211E8288	S1-3C	8.82
C	MS3102R28-11P	J7-E	13211E8288	S1-4A	9
B	MS3102R28-11P	J7-D	13211E8288	S1-4C	8
	MS3102R28-11P	J7-B	MS25038-108	S8-2	4
6B	MS3102R28-11P	J7-H	13211E8288	S1-21	9.47
	13211E8288	S1-12	MS25038-153	S2-2	4.5
	MS25038-153	S2-1	MS25038-108	S8-1	5

I.D. No.	Terminal Type	Term. No.	Terminal Type	Term
		Electrical Lead Pressure Cutout Switches		
V7A16	MS25036-153	S6-1	MS25036-153	
		Wiring Harness — Power Input to RFI Filter		
X2A10A	MS3100R22-22P	J1-A	MS3106R22-22S	
X3A10B	MS3100R22-22P	J1-B	MS3106R22-22S	
X4A10C	MS3100R22-22P	J1-C	MS3106R22-22S	
X5A10N	MS3100R22-22P	J1-D	MS3106R22-22S	
		Wiring Harness — Junction Box Power Input		
X2B10A	MS3102R22-22P	J2-A	MS25036-112	
X3B10B	MS3102R22-22P	J2-B	MS25036-112	
X4B10C	MS3102R22-22P	J2-C	MS25036-112	
X5B10N	MS3102R22-22P	J2-D	MS25036-112	
		Wiring Harness — Power Input from RFI Filter		
X2L10A	MS3106R22-22P	P11-A	MS3106R22-22S	
X3L10B	MS3106R22-22P	P11-B	MS3106R22-22S	
X4L10C	MS3106R22-22P	P11-C	MS3106R22-22S	
X5C10N	MS3106R22-22P	P11-D	MS3106R22-22S	
		Wiring Harness — Hester		
X15C16A	MS3100R14S-6P	J8-A	MS25036-108	H
X19C16B	MS3100R14S-6P	J8-B	MS25036-108	H
X17C16C	MS3100R14S-6P	J8-C	MS25036-108	H
X8C16C	MS3100R14S-6P	J8-D	MS25036-108	H
X7C16B	MS3100R14S-6P	J8-E	MS25036-108	H
X9C16A	MS3100R14S-6P	J8-F	MS25036-108	H
X24B16A	MS25036-108	HR1-B	MS25036-108	H
X21B16B	MS25036-108	HR2-B	MS25036-108	H
X22B16C	MS25036-108	HR3-B	MS25036-108	H
		Wiring Harness — Junction Box		
X43A16A	MS3102R36-7S	J3-P	MS25036-153	K5-
X44A16B	MS3102R36-7S	J3-P	MS25036-153	K5-
X28A16A	MS3102R36-7S	J3-S	MS25036-153	K5-
X23A16B	MS3102R36-7S	J3-h	MS25036-153	K5-
X25A16A	MS3102R36-7S	J3-U	MS25036-153	K5-
Z20A16B	MS3102R36-7S	J3-R	MS25036-153	K5-
V4D16	MS3102R36-7S	J3-Z	MS25036-153	K5-
X39A16A	MS25036-153	K5-A1	MS25036-153	K4-
V4C16	MS25036-153	K5-X2	MS25036-153	K4-
X41A16B	MS25036-153	K5-B1	MS25036-153	K4-

FROM		TO		Length (Inches)	W Si
Terminal Type	Term. No.	Terminal Type	Term. No		
Wiring Harness — Junction Box (Con't)					
MS3102R36-7S	J3-c	MS25036-153	K4-A2	10.63	
MS3102R36-7S	J3-a	MS25036-153	K4-B2	10.00	
MS3102R36-7S	J3-X	MS25036-153	K4-C2	9.37	
MS3102R36-7S	J3-W	MS25036-153	K4-D2	8.75	
MS3102R36-7S	J3-V	MS25036-153	K4-D1	6.75	
MS3102R36-7S	J3-O	MS25036-153	K4-X2	9.00	
MS25036-153	K4-X1	MS25036-153	K5-X1	9.00	
MS3102R36-7S	J3-f	MS25036-153	XF2-2	14.75	
MS3102R36-7S	J3-g	MS25036-153	XF2-2	14.75	
MS3102R36-7S	J3-C	MS25036-106	TB2-1	7.25	
MS3102R36-7S	J3-E	MS25036-106	TB2-2	7.62	
MS3102R36-7S	J3-G	MS25036-106	TB2-3	6.00	
MS3102R36-7S	J3-H	MS25036-106	TB2-4	6.38	
MS3102R36-7S	J3-1	MS25036-106	TB2-5	6.75	
MS3106R36-7S	J3-J	MS25036-106	TB2-5	8.75	
MS3106R36-7S	J3-K	MS25036-106	TB2-6	9.12	
MS25036-153	K5-X1	MS25036-106	TB2-6	9.12	
MS3102R36-7S	CB1-B1	MS25036-112	K1-B2	12.95	
MS3102R36-7S	J3-v	13216E6191-3	CB1-A2	20.62	
MS3102R36-7S	J3-w	13216E6191-3	CB1-C2	20.62	
MS3102R36-7S	J3-D	MS25036-106	TB2-1	7.50	
MS3102R36-7S	J3-F	MS25036-153	K1-X1	17.37	
MS3102R36-7S	J3-L	MS25036-108	K2-A1	16.63	
MS3102R36-7S	J3-M	MS25036-106	K2-B1	15.95	
MS3102R36-7S	J3-N	MS25036-106	K2-C1	15.50	
MS3102R36-7S	J3-t	MS25036-112	E1	4.75	
MS3102R36-7S	J3-Y	MS25036-106	E1	4.75	
MS3102R36-7S	J3-p	MS25036-106	XF1-4	16.25	
MS3102R36-7S	J3-d	MS25036-106	TB2-4	10.86	
MS3102R36-7S	J3-e	MS25036-153	K2-X2	17.37	
MS3102R36-7S	J3-b	13216E6192	CB1-NO	20.62	
MS3102R36-7S	J3-x	MS25036-108	TB1-1	12.37	
MS3102R36-7S	J3-y	MS25036-106	TB1-3	13.50	
MS3102R36-7S	J3-z	MS25036-106	TB1-2	12.25	
MS25036-153	K2-X1	MS25036-106	TB2-6	11.49	
13216E6191-2	CR1-2	MS25036-106	TB2-6	15.62	
MS25036-112	TB1-2	MS25036-112	K1-B1	13.45	
MS25036-112	TB1-1	MS25036-112	K1-A1	13.75	
MS25036-112	TB1-3	MS25036-112	K1-C1	13.75	
13216E6192	CB1-C	MS25036-153	K1-B1	4.30	

Wire I.D. No.	FROM Terminal Type	Term. No.	TO Terminal Type	Term.
	Wiring Harness — Junction Box (Con't)			
V13E16N	MS25036-153	K1-X1	MS25036-153	K
X2H12A	MS25036-112	K1-X1	MS25038-112	K
X3J12B	MS25036-112	K1-B1	MS25036-112	K
X4G12C	MS25036-112	K1-C1	MS25036-112	K
X4H16C	MS25036-153	K4-D3	MS25036-108	K
X4K16C	MS25036-153	K4-D3	MS25036-153	K
X2J16A	MS25036-106	XF1-1	MS25036-108	K
X13D16N	MS3102R-36-7S	K3-5	MS25036-153	K
V14B16	MS3102R-36-7S	K3-2	MS25036-106	T
V14A16	MS3102R-36-7S	K3-2	MS3102R36-7S	K
V12B16	MS3102R-36-7S	K3-3	MS25036-106	T
V2A16	13216E6191-2	CR1-3	MS25036-106	X
X35A16A	13216E6191-2	CR1-1	MS25038-108	T
X34A163	13218E6191-2	CR1-4	MS25036-106	T
X33A16A	MS25036-106	T1-H2	MS25036-106	X
X31A16B	MS25036-106	T1-H1	MS25036-106	X
X20A12B	MS25036-112	CB1-B2	MS3102R36-7S	J
V8F16N	MS25036-106	TB2-6	MS25036-108	E
X3L16B	MS3102R36-7S	J3-A	MS25036-108	T
X4L16C	MS3102R36-7S	J3-B	MS25036-108	T
	Wiring Harness — System Interconnecting			
V3B16*	MS3106R36-7P	P3-g		S
V4A16*	MS3106R36-7P	P3-O		S
X27B16C	MS3106R36-7P	P3-V	MS3106R20-27S	P
X4D14C	MS3108R36-7P	P3-y	MS3108R28-11S	P
V6E16	MS3108R36-7P	P3-C	MS25038-153	S
X13B16B	MS3106R36-7P	P3-b	MS3108R36-7P	P
X29B16C	MS3106R36-7P	P3-W	MS3106R20-27S	P
V5B16	MS3106R36-7P	P3-D	MS3106R28-11S	P
X8B16A	MS3106R36-7P	P3-c	MS3106R28-11S	P
X19B16B	MS3106R36-7P	P3-M	MS3106R145-6S	P
X20B16B	MS3106R36-7P	P3-R	MS3106R20-27S	P
X25B16A	MS3106R36-7P	P3-U	MS3108R20-27A	P
X16B16A	MS3106R36-7P	P3-L	MS3106R14S-8S	P
V4E16	MS3106R36-7P	P3-Z	MS3108R28-11S	P
V10B16	MS3106R36-7P	P3-e	MS3106R28-11S	P
X32B12C	MS3106R38-7P	P3-w	MS3106R20-15S*	P
X26B12B	MS3106R36-7P	P3-u	MS3106R20-15S	P
V11E16	MS3106R36-7P	P3-H	MS3106R12S-3S	P

FROM		TO		Length	Wire
Terminal Type	Term. No.	Terminal Type	Term. No.	(Inches)	Size
Wiring Harness — System Interconnecting (Con't)					
MS3106R36-7P	P3-t	MS25036-157	E3	17.00	12
MS3106R36-7P	P3-G	MS3106R20-15S	P4-D	31.00	16
MS3106R36-7P	P3-K	MS3106R12S-3S	P5-A	35.00	16
MS3106R36-7P	P3-J	MS3106R20-15S	P4-E	31.00	16
MS3106R36-7P	P3-v	MS3106R20-15S	P4-A	31.00	12
MS3106R36-7P	P3-N	MS3106R14S-6S	P8-C	60.00	16
MS3106R36-7P	P3-d	MS3106R28-11S	P7-T	19.00	16
MS3106R36-7P	P3-Y	MS3106R28-11S	P7-A	19.00	16
MS3106R36-7P	P3-f	MS3106R28-11S	P7-X	19.00	16
MS3106R36-7P	P3-x	MS3106R28-11S	P7-J	19.00	14
MS3106R36-7P	P3-z	MS3106R28-11S	P7-M	19.00	14
MS3106R36-7P	P3-a	MS3106R28-11S	P7-U	19.00	16
MS3106R36-7P	P3-1	MS25036-153	S6-2	88.00	16
MS3106R36-7P	P3-S	MS3106R20-27S	P9-E	40.00	16
MS3106R36-7P	P3-h	MS3106R20-27S	P9-D	40.00	16
MS3106R36-7P	P3-p	MS3106R28-11S	P7-C	19.00	16
MS3106R14S-6S	P8-D	MS3106R28-11S	P7-E	89.00	16
MS3106R14S-6S	P8-E	MS3106R28-11S	P7-D	69.00	16
MS3106R14S-6S	P8-F	MS3106R28-11S	P7-V	69.00	16
MS3106R36-7P	P3-P	MS3106R20-27S	P9-G	40.00	16
MS3106R36-7P	P3-T	MS3106R20-27S	P9-H	40.00	16
MS3106R36-7P	P3-X	MS3106R20-27S	P9-J	40.00	16
MS3106R36-7P	P3-A	MS3106R20-15S	P4-G	31.00	16
MS3106R36-7P	P3-B	MS3106R20-15S	P4-F	31.00	16

essure switch assembly . . . . .

performing the following:

(1) Turn off electrical power supply to disconnect power cable from unit.

(2) Disconnect drain hose from unit (if

NOTE

Disconnect duct work, CBR filter and rem if used.

(3) Unbolt unit from mounting surface.

(4) Close the canvas cover.

4-47. SHIPMENT.

The air conditioner should be moved as follow

(1) Short Distance Movement. Lift unit lift or carry unit to new worksite sides of unit. Keep unit vertical.

(2) Long Distance Movement. Crate the providing adequate protection for g panel. Refer to TM 38-250 for crat Provide suitable blocking and tiedo from shifting during transfer. Kee

For adminstrative storage of equipment refer instructions.

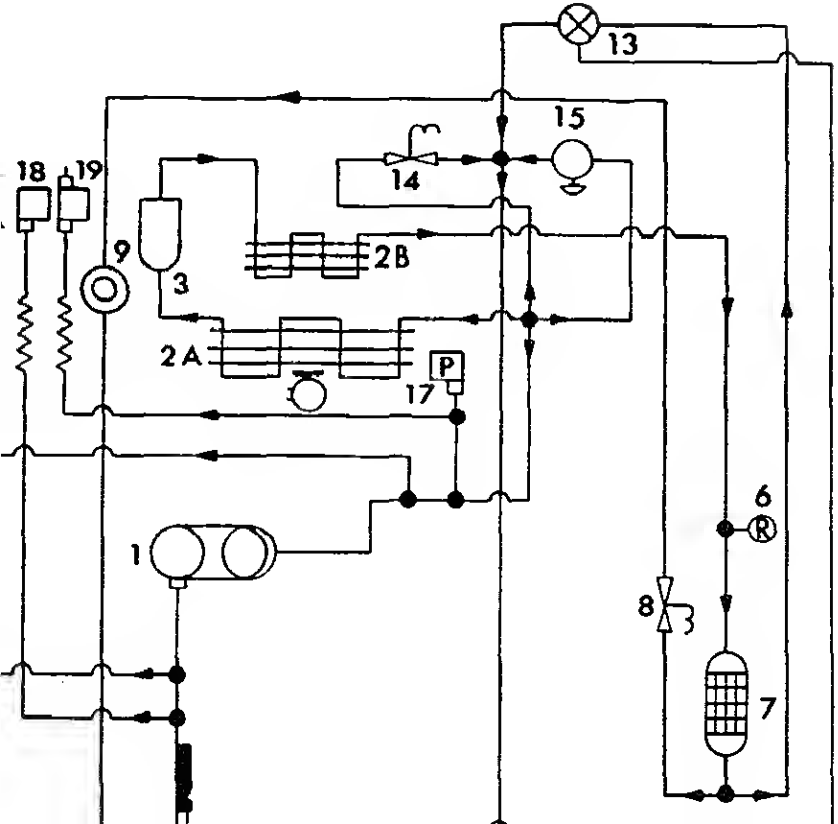
L.

apter is for the use of direct support maintenance
This chapter contains a section on troubleshooting and
procedures for discharge, leak testing, evacuation,
essure testing of the air conditioner after the replace-
onents that require system discharge. Figure 5-1 is a
flow diagram that is included to assist maintenance of
components.

Section II. TROUBLESHOOTING

L.

ction contains troubleshooting information (table 5-1) f
t Support Maintenance personnel. The malfunctions perta
nt components only. The organizational maintenance
ing table in Chapter 4 should be reviewed prior to any
of refrigerant components.



1. Compressor (3 Phase, 50/60 Hz, 208
2A. Condenser Coil
2B. Subcooler Coil
3. Receiver
4. (Not Used)
5. (Not Used)
6. Pressure Relief Valve
7. Filter-drier (Dehydrator)
8. Solenoid Valve (Evaporator)
9. Sight-glass Liquid Indicator
10. Expansion Valve (Evaporator)
11. Distributor
12. Evaporator Coil
13. Expansion Valve (Liquid Quench)
14. Solenoid Valve (Bypass)
15. Pressure Regulating Valve
16. Service Valve
17. Pressure Switch (two-speed fan)

T COOLING

Check sight glass liquid indicator for bubbles. If bubbles exist check system for leaks.

ir leaks, and recharge system (para 5-5 through 5-8).

Feel filter-drier (dehydrator) to see whether it is cold to the touch, or is frosted or sweating. Cold discharge indicates obstruction.

harge system slowly over a period of about one hour to ent oil being blown out of system, then replace filter- r (para 5-15).

Check inlet and discharge sides of solenoid valves for temperature difference. Abnormally cold discharge indicates leakage or obstruction.

ir or replace faulty solenoid valve (para 5-14).

Check evaporator coil for over-all temprature. If part of coil is relatively warm, and evaporator refrigerant inlet is sweaty or frosty, expansion valve may be damaged or obstructed.

ace faulty expansion valve (para 5-22).

NOISY OPERATION

CAUTION

nocking or hammering is heard when air condi- er is started up, shut down at once. compressor may be pumping liquid refrigerant, n will cause severe damage.

Listen for knocking or hammering sounds. Install gauge set and check for high discharge pressure (para 5-8).

d off some refrigerant (para 5-3).

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

3- COMPRESSOR WILL NOT START

Step 1. Check condition of high- and low-
switches by pressing reset button
pressure cutout switches (para 5-

Step 2. Disconnect plug, P4, from compres
an ohmmeter or continuity tester,
points A-B, A-C, B-C, and D-E. C
indicated. Test points A, B and
or common ground. No continuity

Replace compressor that does not meet
ments (para 5-9).

4- COMPRESSOR STARTS BUT STOPS AT ONCE -- "SHOR

Step 1. Check sight-glass liquid indicato
compressor is operating. If bubb
refrigeration system for leaks (p

Repair leaks, and add refrigerant unt
when compressor is running.

Step 2. Connect pressure gauges to suctio
service valves. Check system pre
indicated in the following Table:

NORMAL TEMPERATURE — PRESSURE RE

	95°F (36°C) dry bulb return air to unit		
Outdoor ambient temperature	50°F 10°C	75°F 24°C	100°F 38°C
Gauge Pressures			
Suction (psig) (Kg/Cm²)	56-60 3.93-4.22	56-65 3.93-4.57	65-75 4.57-5.27
Discharge (psig) (Kg/Cm²)	135-155 9.50-10.90	185-205 13.00-14.41	275-295 19.33-20.74

80°F (27°C) dry bulb return air to unit

t	50°F 10°C	75°F 24°C	100°F 38°C	125°F 52°C	
s					
	56 min. 3.93 "	56 min. 3.93 "	56-65 3.93-4.57	65-75 4.57-5.27	
	130-150 9.14-10.55	180-200 12.65-14.06	270-290 18.98-20.39	290-410 20.39-28.82	

b temperatures are measured with an ordinary thermometer

f pressures are too low, check for leaks and add refrig-
rant; if too high, bleed off refrigerant until pressure
ormal.

. If pressures are normal, turn off power, and short-ci
cuit high- or low-pressure cutout switch. Turn on
power for maximum of 12 seconds, and see whether
compressor operates normally.

CAUTION

o not exceed 12-second operating time, or vacuum
ay be formed in suction side of refrigeration sys-
em and damage compressor.

leed off refrigerant slowly, over a period of about one
our, to prevent oil being blown out of system, then
eplace faulty pressure cutout switch and recharge system

OR RUNS BUT DOES NOT COOL

. Check sight-glass liquid indicator for bubbles indica
ing low charge of refrigerant. If bubbles are presen
check refrigeration system for leaks (para 5-5) .

ischarge system slowly, over a period of about one hour,
revent oil being blown out of system, then repair leaks
eplace leaking component.

Step 2. Remove evaporator air discharge g
evaporator coil icing. If icing
gas bypass pressure regulating va
pressure).

CAUTION

Do not use steam, open flame, heat gu
high-temperature heat source to thaw
porator coil.

Thaw an iced coil with a lamp bulb (7
dryer or electric fan, and adjust pre

Step 3. Check compressor motor for noisy
pressure, or excessively low disc
cating leaky internal valves.

Bleed off refrigerant slowly, over a
hour, to prevent oil being blown out
faulty compressor and recharge systen

6- SUCTION PRESSURE TOO LOW OR TOO HIGH

Step 1. Stop compressor and check thermos
as follows:

a. Remove insulating compound from re
bulb from refrigerant line. (Note
removal and be sure it is replaced

b. Place bulb in ice water for 1-2 m

c. Remove bulb from ice water and hol
warm it. At the same time, start
the suction line for a rapid chang
indicates flood-through of liquid
floods through valve, it is operat
not, valve or remote bulb it fault

CAUTION

not let liquid flood back into compressor for
re than 2-3 seconds or the compressor will be
riously damaged.

scharge refrigerant from system slowly, over a period of
out one hour, to prevent blowing oil out of system.
place faulty expansion valve and filter-drier (para 5-22
d 5-15). Purge with dry nitrogen and recharge (para
7).

Feel filter-drier for temperature difference. Dischar
end will feel cooler than input end if clogged, or
discharge end may be sweaty or frosty.

scharge refrigeration system slowly, over a period of
out one hour to prevent blowing oil out of system.
place filter-drier, purge with dry nitrogen, and recharg

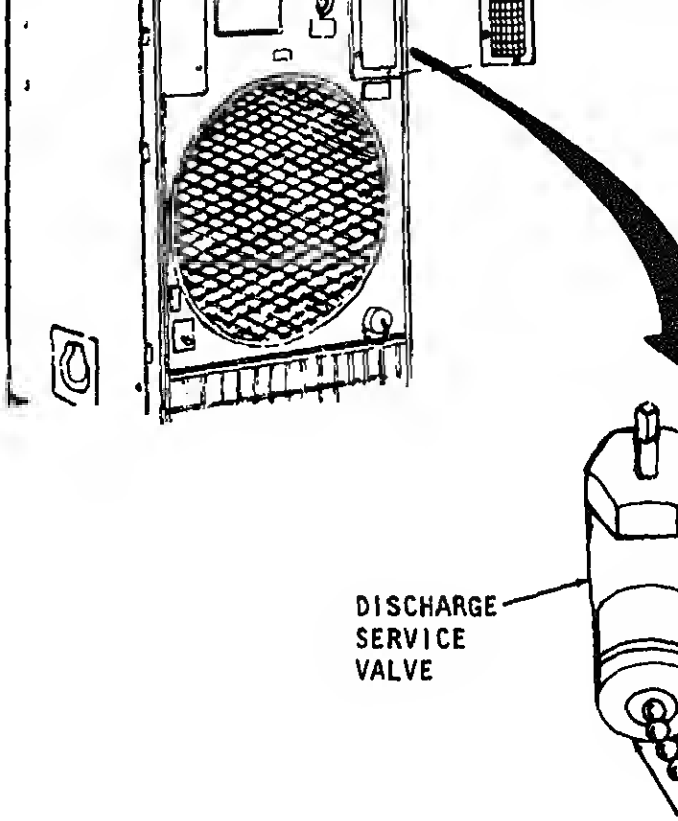
Section III. MAINTENANCE PROCEDURES

DISCHARGE.

removing any refrigeration component from the air con-
l refrigerant gas must be discharged from the system.
gure 5-2.) Proceed as follows:

- Remove five screws from the frame of the fresh air screen in the upper right-hand corner of the rear surface of the air conditioner. Remove the fresh air screen to obtain access to the suction and discharge service valves.

- Remove the chained cap from the suction service valve, and connect a hose of sufficient length to reach a saf location, preferably outdoors, for discharge of refrigerant gas.



REMOVE

Figure 5-2. System Disc

WARNING

Use great care to avoid contact wit
erant or refrigerant gas being disc
container under pressure. Sudden a
tissue damage can result from freez
mal protective gloves and a face pr
situation where skin- or eye-contac
Prevent contact of refrigerant gas
metal surfaces. Heat causes the re
break down and form carbonyl chlori
highly toxic and corrosive gas.

3 - Crack open the suction service
refrigerant gas slowly, even a

nitrogen is always used to purge the refriger-
n system during brazing or debrazing of con-
ions, to prevent internal oxidation and scaling.

nitrogen (item 8, table E-1) flowing through the syste
ing connections can be debrazed. Refer to paragraph
ds of tubing repair, disconnection, and replacement.

WARNING

urethane Foam insulation breaks down to form
c gases when heated to brazing temperatures.
r to paragraph 5-13(4), Protection from Heat.

ING.

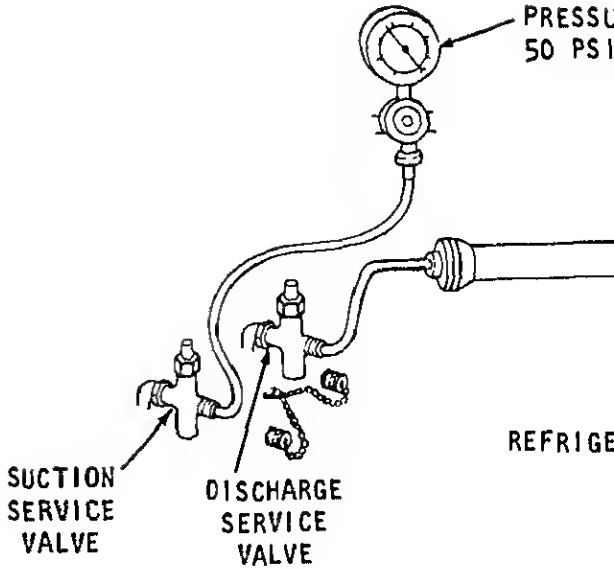
the refrigeration system after repair or replacement
nt. Refer to figure 5-3 and proceed as follows:

a pressure gauge to the suction service valve, and a
frigerant (item 11, table E-1)to the discharge service
oth service valves and the cylinder shutoff valve. Le
ow into the system until the pressure gauge indicated
n^2). Close cylinder shutoff valve and discharge
and disconnect the refrigerant cylinder.

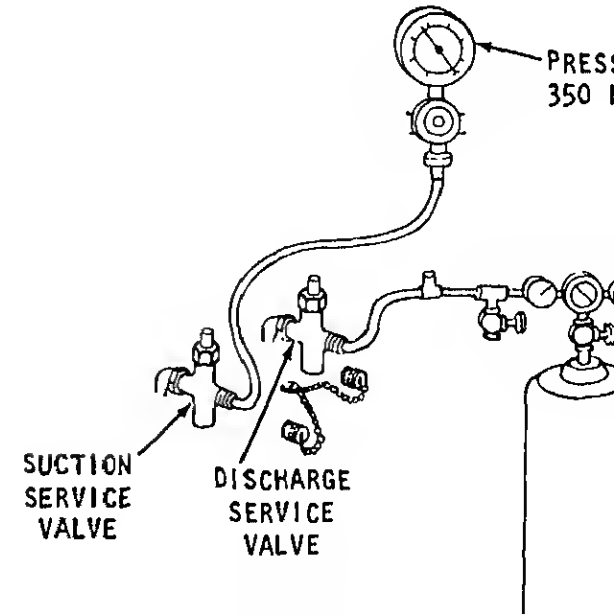
a cylinder of dry nitrogen (item 8, table E-1) to the
ice valve. Open the cylinder shutoff valve and the
ice valve, and pressurize the system to 350 psig (22
e all three valves, and test for leaks, using an
c detector, or the soap bubble method as described

CAUTION

electronic leak detector is sensitive to the
ence of refrigerant gas (item 11, table E-1)
ne atmosphere. When refrigerant gas is present
ne atmosphere of the work area, false indica-
s can result. Use in a well ventilated but
t-free area.



CORRECTING REFRIGERANT



and watch for bubbles. Follow a definite sequence to
g any points that should be tested. Wipe the solution
nts, and mark any point at which a leak is found.

arge the system after leak testing by connecting a hose t
service valve, and cracking the valve open slightly to
arge the gas. Too rapid discharge will cause oil to be
the compressor. If leaks were detected, repair them and
rected above. If the system is leak-tight, double evacu-
ge the system as directed below.

TING THE SYSTEM.

the system is charged with refrigerant, it must be
vacuated to exhaust water vapor, non-condensible gases ar
ties which would prevent the system from operating.
ure 5-4 and proceed as follows:

NOTE

e following instructions are provided for use by
frigeration shops furnished with only the most
sic equipment. If more sophisticated equipment,
ch as two-valve or four-valve service manifolds is
ailable, it should be used by making appropriate
difications to these instructions.

ct a vacuum pump to the suction service valve gauge port,
gauge to the discharge service valve gauge port. Start
d open both service valves. Operate the vacuum pump unti
the system is reduced to not more than 500 microns. Clos
service valve, and turn the vacuum pump off. Let the uni
s condition for at least three hours. If the system hold
ithout change of pressure, continue with step b. If the
acuum cannot be held for three hours, break the vacuum
rogen and retest for leaks. If 500-micron vacuum cannot
one or more of the following reasons may account for the

esence of water vapor in the system. Continued pumping
this condition.

aks in the refrigeration system. Break the vacuum with
(item 8, table E-1), and retest for leaks (para 5-5).

ternal leakage of vacuum pump. Test the pump by connec-
n gauge directly to the vacuum pump intake and continue t
mp still fails to reach 500 microns, the pump is faulty.

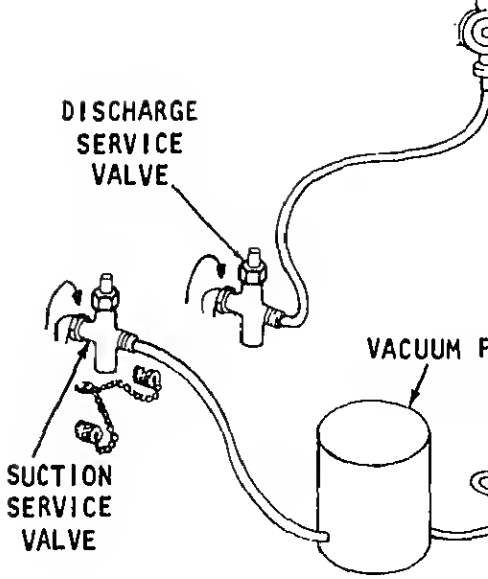


Figure 5-4. Evacuating the S

b. With the suction line service valve clos vacuum pump and attach a cylinder of dry nitro E-1). Leave the connection to the suction ser loose, and open the nitrogen cylinder shutoff seconds to purge the line of air. Tighten the the suction service valve open slightly to bre this configuration until the system reaches at mm) then close the suction service valve and t valve, and disconnect the nitrogen cylinder.

c. Reconnect the vacuum pump to the suctio port, and start the pump. Open the suction se pump until a 500-micron vacuum is achieved. T will remove all traces of water vapor and non- system. Close the suction service valve, and pump. Close the discharge service valve, and gauge.

ervice valve connections. Charge the refrigeration
ected in the following steps:

CAUTION

not attempt to charge liquid refrigerant into the
tion line. The compressor would be damaged.

NOTE

kinds of refrigerant cylinders are in general
. One is equipped with a single shutoff valve,
must be inverted when charging liquid refriger-
. The other is equipped with a vapor valve and
iquid valve, which makes it possible to charge
her liquid or vapor when the cylinder is upright.
n using the two-valve cylinder; disregard in-
uctions to position the shutoff valve down, and
nect the service line to the liquid valve instead.

the refrigerant cylinder on a scale of sufficient
h the shutoff valve down, or suspend the cylinder from a
m scale, with the valve end down.

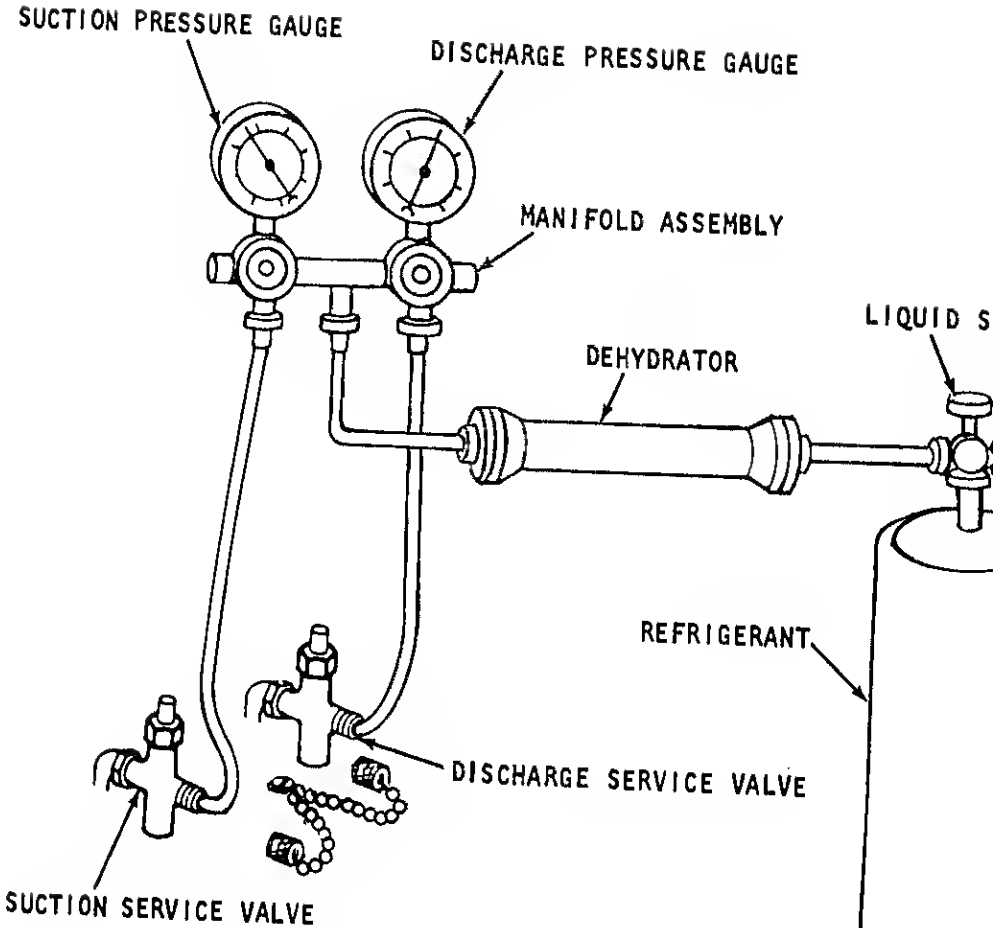
the cylinder, and record the weight.

he discharge service valve, and slightly open the
off valve. Liquid refrigerant will be sucked into the
system rapidly at first, then more slowly as pressures
lize. When 5.0 pounds (2.27 kg) of refrigerant have
he refrigeration system, close the discharge service
cylinder shutoff valve.

NOTE

junction box and control panel assemblies and the
er panel must be in place to operate the air con-
ioner and to complete the charging operation. If
y were removed for maintenance, install them now,
accordance with paragraphs 4-24 and 4-28.

operation and top off refrigerant as necessary, in the
ner.



NOTES

1. THE VAPOR VALVE IS NOT USED ON A TWO VALVE SYSTEM.
2. IF A ONE VALVE CYLINDER IS USED INVERT THE CYLINDER.

efrigerant before attempting another start.

ith power connected to the air conditioner, turn the rot
itch to COOL and the temperature control thermostat to t
REASE position. Let the air conditioner operate for 15
this mode, then observe the sight-glass liquid indicator
ir conditioner is running. If bubbles or milkiness appe
refrigerant charge as follows:

ith the air conditioner compressor operating, open the
vice valve and the cylinder shutoff valve to charge refr
nto the system. Continue to observe the sight-glass liq

hen the liquid in the sight-glass liquid indicator runs
ree of bubbles, close the suction service valve and the
utoff valve.

isconnect the manifold assembly and the refrigerant
nd pressure-test the air conditioner.

URE TESTING.

re testing the refrigeration system is an important
procedure which you should perform whenever the system h
recharged after replacement of a component or when the a
is operating inefficiently. Pressure testing is accom-
connecting individual pressure gauges or a refrigeration
anifold to the suction line and discharge line service

ription. Every refrigeration system has its own specifi
ressures for the suction and discharge sides of the com-
a given ambient temperature. The temperature-pressure
ps for the air conditioner are shown in Table 5-2.

Outdoor ambient temperature	$50^{o}F$ $10^{o}C$	$75^{o}F$ $24^{o}C$	$100^{o}F$ $38^{o}C$
Gauge Pressures			
$Suction_2$(psi) (Kg/Cm^2)	56-60 3.93-4.22	56-65 3.93-4.57	65-75 4.57-5.27
$Discharge_2$(psi) (Kg/Cm^2)	135-155 9.50-10.90	185-205 3.00-14.41	275-295 19.33-20.74

$80^{o}F$ ($27^{o}C$) dry bulb return air to u

Outdoor ambient temperature	$50^{o}F$ $10^{o}C$	$75^{o}F$ $24^{o}C$	$100^{o}F$ $38^{o}C$
Gauge Pressures			
$Suction_2$(psi) (Kg/Cm^2)	56 min. 3.93 "	56 min. 3.93 "	56-65 3.93-4.57
$Discharge_2$(psi) (Kg/Cm^2)	130-150 9.14-10.55	180-200 12.65-14.06	270-290 18.98-20.39

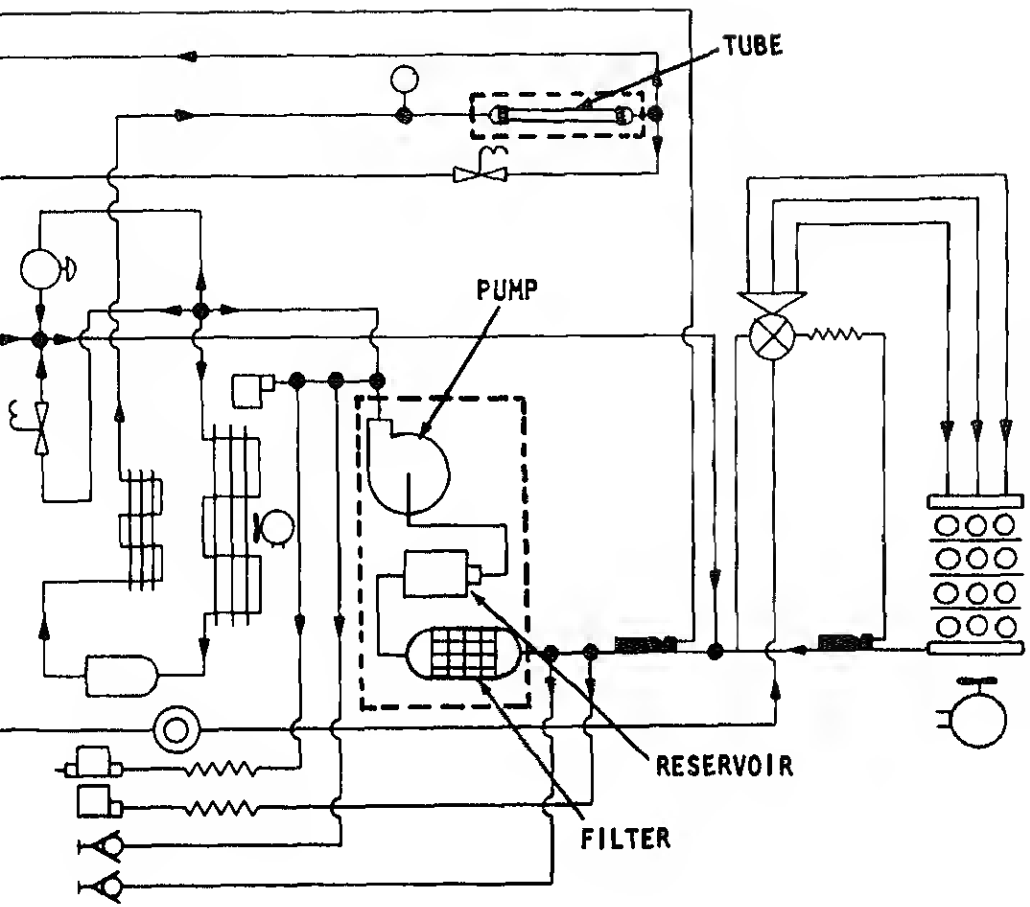
NOTE: Dry bulb temperatures are measured with an ordinar

b. Set up. Prepare the air conditioner for shown in figure 5-6 and as directed in the follo

(1) Make sure that the fresh air damper is closed, and that the evaporator air intake and c fully open.

(2) Hang an accurate thermometer directly evaporator air intake grille to register "dry bu temperature.

(3) Hang an accurate thermometer directly condenser coil guard, making sure that the therm direct sunlight, to record "outdoor ambient temp


TUBE
PUMP
RESERVOIR
FILTER

c. Procedure. Perform the pressure test in

(1) Turn the rotary selector switch to CO
control thermostat to maximum DECREASE.

(2) Slowly open the suction line and disc
valves to which pressure gauges have been conne

(3) Let the air conditioner operate for a
the cooling mode, so that all parts of the syst

(4) Record the temperatures indicated by
the pressures indicated by both pressure gauges

(5) Compare the readings obtained from pu
the normal ranges shown in Table 5-2.

d. Analysis of Discrepancies. If actual pr
relationships differ from those shown in Table
following reasons, and take appropriate action.

(1) If pressures are too low: Check for
5-5), repair, recharge the system (paragraph 5-
repeat the pressure test.

(2) If pressures are too high: Close the
remove the pressure gauge, and bleed off the ap
refrigerant. Repeat the pressure test.

(3) If discharge pressure is extremely hi
is extremely low, blockage may exist in the re
Troubleshoot, correct the trouble, recharge if
the pressure test.

e. Completion. After pressure testing has
completed, close both service valves, remove ga
service valves, and install fresh air screen,
secure it. Remove thermometers from the unit.

refrigeration compressor is a self-contained unit whic
reciprocating compressor, a drive motor and a life tim
oil hermetically sealed into a dome-shaped steel hous
e type crankcase heater is mounted around the outside
r housing near the base. The purpose of the crankcase
vent migration of liquid refrigerant into the compress
ner. Liquid refrigerant could mix with the oil, causi
pumped throughout the system. Also, fluids are incom
would cause serious damage to the compressor if permi
while operating.

minary Requirements.

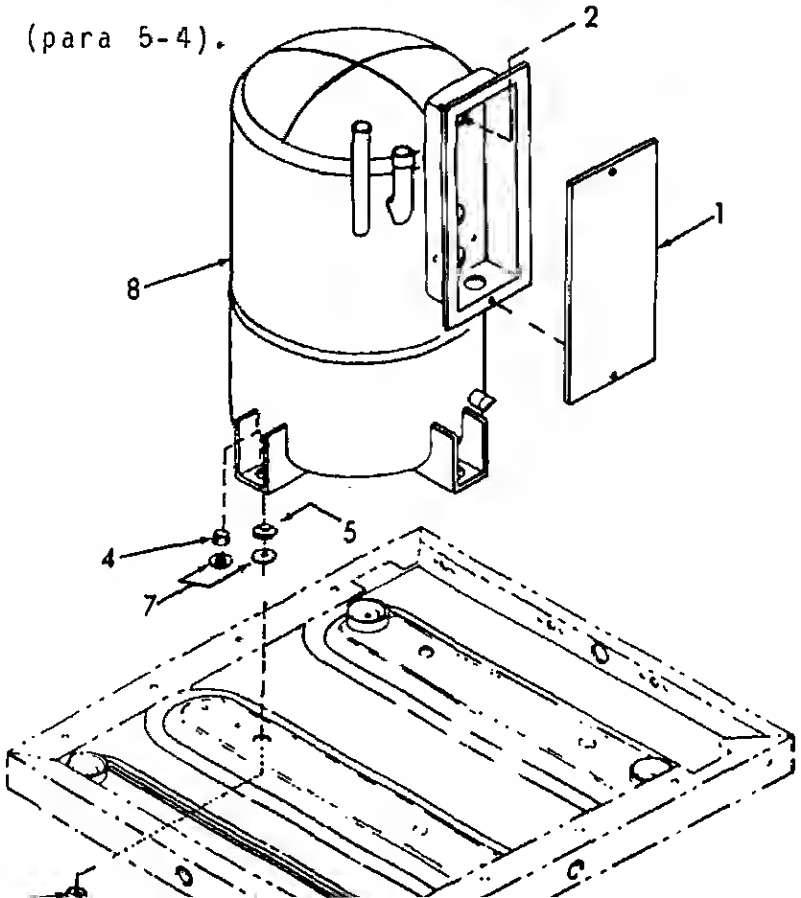
(1) System discharge (para 5-3).

(2) Remove lower panel (para 4-12).

(3) Remove junction box (para 4-28).

(4) Compressor tests (para 4-40.1).

(5) Debrazing (para 5-4).



When hoisting the air conditioner b
sling through the handles, use a sp
prevent the sling damaging the casi

(a) Hoist the air conditioner onto supp
height to permit insertion of a socket wrench
mounting holes in the base plate.

(b) Remove four shoulder bolts (3) and
(5) and eight of each size of washers (6 & 7)
legs of the compressor (8).

(c) Lever the compressor up, and slide
conditioner.

d. Installation.

NOTE

If refrigeration piping was disconn
compressor being replaced, transfer
the replacement compressor before i
the air conditioner.

(1) Mounting. Set the compressor i
plate of the air conditioner.
up, and insert bushings (5) and
support feet. Install shoulder
& 7) from below, and install nu
of mounting foot.

(2) Tubing Connection. Provide a l
flow of dry nitrogen (item 8, t
refrigeration system, and braze
the compressor.

(3) Replacement of Filter-Drier.

NOTE

Whenever the refrigeration system h
new filter-drier must be installed
(See para 5-15).

5-5 through 5-8.

SOR MOTOR BURNOUT.

f a compressor motor is indicated by lack of continuit
indings and the condition of compressor oil, which mus
after the compressor has been removed from the refrig-
. Causes of compressor motor burnout include the

e voltage, which causes motor windings to overheat.
out completely, the overheated windings cause chemica
ne refrigerant and the oil to form sludge and other
nants.

refrigerant. An inadequate charge of refrigerant gas
reduces the amount of cooling gas within the compresso
radual overheating of the motor and failure of the

ad pressure. High head pressures can be caused by
ty condenser coils or screens, or by an inoperative
High head pressure requires the compressor to work
ng additional heat which ultimately can result in moto
ventilation around the condenser, and extremely high
atures can also cause motor failures.

e in system. Leakage of air into the refrigeration
a chain reaction which can result in motor burnout. A
n and moisture which combine with refrigerant gas to
ric and hydrofluoric acids. These combine with compre
m an acid sludge which is carried throughout the syste
cks the motor windings, causing short circuits and

SING COMPRESSOR MOTOR BURNOUT.

ortant to diagnose the type of compressor motor failur
s. Simple failure, without motor burnout, does not
tensive cleaning of the entire refrigeration system th
es. Also, motor burnout indicates other problems that
ed to the failure, and these problems must be correcte
prevent repetition of the burnout. After removal of a
from the refrigeration system, remove all external
the compressor toward the discharge port to drain a
of oil into a clear glass container. If the oil is
r, and does not have an acrid smell, the compressor di

You must clean the entire refrigeration s
has occurred, since contaminants will have bee
corners and restrictions in the piping and fit
inants will soon mix with new refrigerant gas
cause repeated burnouts. To clean the system
follows:

a. Remove the filter-drier (para 5-15), an
the refrigeration system. To do this, connect
nitrogen (item 8, table E-1) to each filter-dr
and open the cylinder shutoff valve for at lea
(3.5 kg/cm^2) pressure.

b. Connect the two filter-drier fittings w
manufactured from refrigerant tubing and fitti
reservoir and filter in place of the compresso

c. Disassemble both expansion valves and t
valve cages. Re-install shell of power assemb
manufactured gasket between power assembly and
age. Tag and retain valve cages for use at re

NOTE

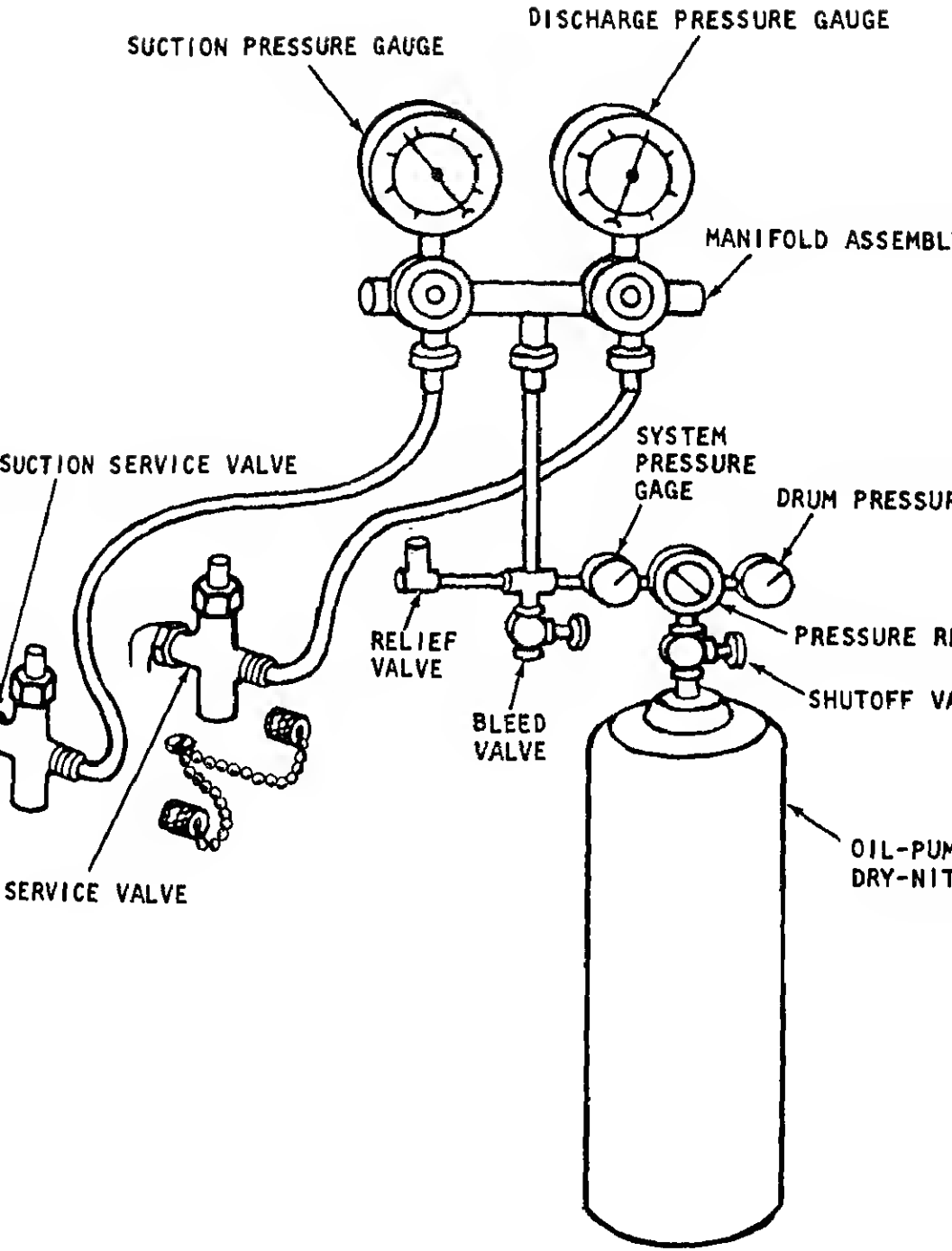
An unused filter-drier or other suit
be used as the filter.

d. Fill reservoir with fluorocarbon refrig
E-1) and start the pump. Continue filling the
erant, until it begins to pour out of the retu
flushing for at least 15 minutes.

NOTE

During flushing and back-flushing op
24 volts, dc, to the bypass line sol
a total of approximately 10 minutes
This will ensure that the cleaning s
through all parts of the system.

e. Reverse the pump connections, replace t
filtering medium, and back-flush the system fo
minutes.


DISCHARGE PRESSURE GAUGE
SUCTION PRESSURE GAUGE
MANIFOLD ASSEMBL
SUCTION SERVICE VALVE
SYSTEM
PRESSURE
GAGE
DRUM PRESSUR
RELIEF
VALVE
PRESSURE RI
SHUTOFF VA
BLEED
VALVE
OIL-PUM
DRY-NIT
SERVICE VALVE

cages. Install new gaskets, and assemble the va
projections on valve cages fit in notches in valv

h. Disconnect the dry nitrogen cylinder, and
a new filter-drier, making sure that the directio
points up. Cap or plug compressor connections if
be installed immediately.

i. Replace compressor, evacuate and charge sy

5-11. PRESSURE SWITCHES.

a. Description.

The pressure switches, high pressure, low pr
(fan speed) are located in the same assembly. Th
rear of the air conditioner near the fresh air sc
sure switch requires replacement, all of the swit
nected and the assembly removed as one unit.

b. Preliminary tests.

High/Low Pressure (para 4-41.1).

Pressure Switch (para 4-41.2).

WARNING

Disconnect power from the air condition
performing maintenance on the electrica
The voltage used can be lethal.

c. Preliminary Requirements.

(1) Remove fresh air screen (para 4-14)

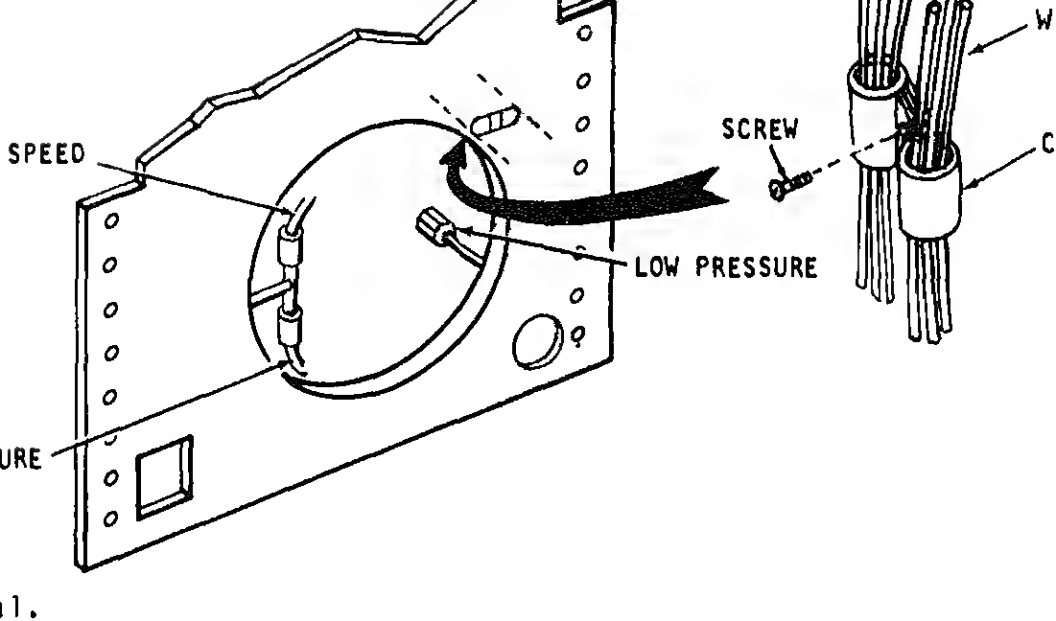
(2) Discharge system (para 5-3).

(3) Remove canvas cover (para 4-8).

(4) Remove top panel (para 4-9).

(5) Remove condenser fan guard (para 4-

(6) Remove condenser fan (para 4-44.2).



l.

(1) Remove screws (1) near each end of the pressure swit reset information plate (2).

(2) Leave pressure switch assembly in place.

WARNING

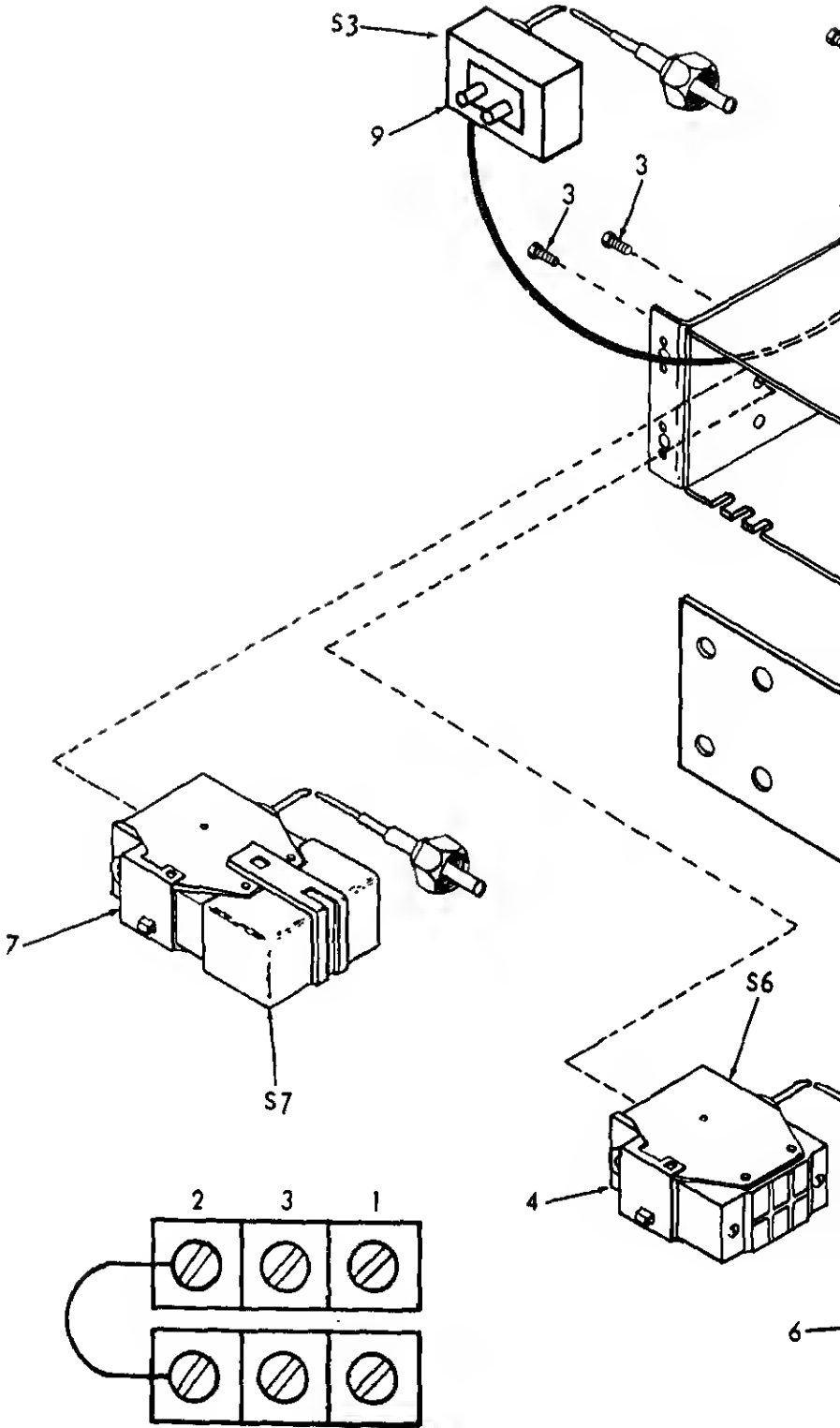
Do not perform the following operation until all refrigerant has been discharged from the system (para 5-3). Escaping refrigerant gas under pressure can cause permanent tissue damage from sudden freezing.

(3) Reach into the upper right corner and remove clamp s ing capillary tubes and wiring harness.

NOTE

It is not necessary to remove all pressure cut-out switches.

(4) Both the high and low pressure cut-out switch connec tions to the refrigeration system are located near t compressor, the low-pressure cut-out switch in a cr fitting in the suction line, and the high-pressure


S3
9
3
3
7
S7
S6
4
6
2
3
1

NOTE

he pressure cut-out switch housing is not removed
rom the unit.

mbly.

) Remove screws (3) in the end of the housing, and remov
both the high and low pressure cut-out switches (4 &
Be careful to avoid kinking the capillary tubes when
removing them from the notches in the edge of the
housing.

) Pry off spring clip (5) on end of pressure cut-out
switch, and remove the spring clip (5) and the cover
from the wire connections. Disconnect wires as
necessary.

) Remove screws (8) in the end of the housing and remove
the fan speed pressure switch (9).

) Disconnect wires as required.

) Test the high-pressure cut-out switch (S7) as follows:

(a) Connect the high-pressure cut-out switch to an ohmmeter, multimeter or other continuity testing device.

CAUTION

o not use compressed air for testing the pressure
ut-out switches. Oil, moisture and other impurities
ould be carried into the refrigeration system.

(b) Connect the capillary flare nut to a cylinder of dry nitrogen(item 8, table E-1), and slowly pre
surize the switch assembly.

(c) When pressure gauge indicates 415 psig (29.17 kg/cm^2) press and release reset button. Continuity should be indicated.

tinuity should be indicated.

(2) Test the low-pressure cut-out swit

(a) Connect the low-pressure cut-o
continuity tester and the sour
8, table E-1), as directed in

(b) Slowly pressurize the switch t
km/cm^2) and press reset button
should be indicated.

(c) Continue to pressurize the swi
(29.17 km/cm^2). Continuity sh
at all times.

(d) Slowly reduce pressure. Conti
at 7 $\pm$ 5 psig (0.5 $\pm$ 0.35 kg/c

(e) If pressure-continuity require
replace the pressure cut-out s

(3) Test the fan speed pressure switch

CAUTION

Do not use compressed air to pressuriz
Traces of oil, moisture and other cont
be carried into the refrigeration syst

(a) Connect a cylinder of dry nitr
E-1) to the body of the press
pressurize the switch.

(b) Observe the pressure gauge an
continuity tester. Continuit
when pressure reaches 400 $\pm$ 1
1.13 kg/cm^2).

(c) Gradually reduce pressure to
observing the pressure gauge
tester. Continuity should dr
psi (24.6 $\pm$ 1.13 kg/cm^2).

(d) Replace the pressure switch i
pressure and continuity requi

) Attach wires to the fan speed pressure switch (9).

) Install a split grommet on the capillary tube and ins grommet in left-hand notch.

) Insert the fan speed pressure switch (9) and secure w screws (8).

) With terminal covers removed from both pressure cutou switches, connect the short wire from terminal 2 of t high-pressure switch to terminal 2 of the low-pressur switch.

) Connect wire leads to terminal 2 of the high-pressure switch and to terminal 1 of the low-pressure switch. Tag the leads for identification. Install both termin covers (6) and retaining clips (5).

) Install a split grommet on both capillary tubes, and insert the low-pressure cutout switch (4) in the lower part of the housing. Secure with two screws (3) Form the capillary tube along the back of the housing the middle notch.

) Insert the high-pressure cut-out switch (7) in the up part of the housing. Lead capillary tube to the rema ing notch. Secure switch with two screws (3). Insta capillary tubes and grommets in notches. Tag connect end for identification.

ation.

) Slowly lower the pressure switch assembly into the to of the unit while guiding the capillary tubes into th proper positions. Avoid kinking the capillary tubes.

) Using a wrench on each side of the joint tighten the connections.

) Replace clamp and screw that secures wiring and capil- lary tubes.

) Replacement of filter-drier.

NOTE

henever the refrigeration system has been opened, new filter-drier must be installed before re-

(8) Replace condenser fan guard (para

(9) Replace top panel (para 4-9).

(10) Replace canvas cover (para 4-8).

(11) Replace fresh air screen (para

5-12. REFRIGERANT COMPONENTS.

The following sections contain the replac servicing procedures for the refrigerant compo 5-7 for component orientation.

5-13. REFRIGERANT TUBING.

Refrigerant tubing is seamless copper whi finish to permit thorough cleaning and to prev ture or other impurities. Both rigid and soft ding upon whether the tubing is to be bent or Sharp changes of direction are accomplished by such as elbows, tees and crosses. Connections soldering or brazing, and by flare fittings.

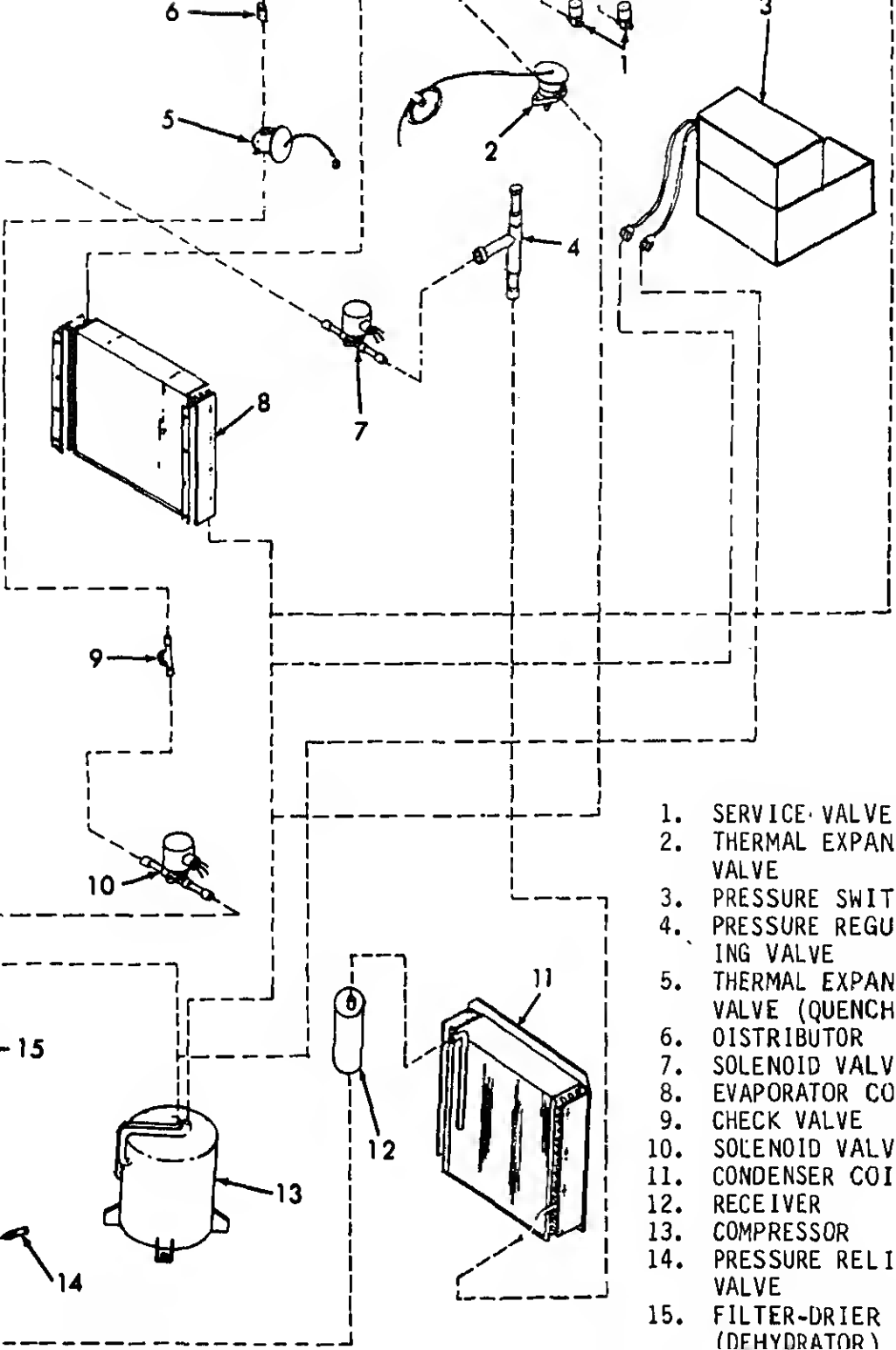
a. Inspection/Test.

Inspect tubing and fittings usually f kinks. If damage appears to be minor to paragraph 5-5). If no leaks are d tubing serviceable.

b. Removal/Installation.

(1) General. The refrigeration syst discharged before removing any p debrazing is required for remova dry nitrogen (item 8, table E-1) through the system while the joi temperature. Any refrigerant ga the system would cause serious c debrazing temperature.

(2) Heating. Sufficient heat should around the joint to reach the me filler metal quickly. Slow or n permits heat to be conducted awa sometimes melting an adjacent jo the one intended.



1. SERVICE VALVE
2. THERMAL EXPANSI VALVE
3. PRESSURE SWITCH
4. PRESSURE REGULA ING VALVE
5. THERMAL EXPANSI VALVE (QUENCH)
6. OISTRIBUTOR
7. SOLENOID VALVE
8. EVAPORATOR COIL
9. CHECK VALVE
10. SOLENOID VALVE
11. CONDENSER COIL
12. RECEIVER
13. COMPRESSOR
14. PRESSURE RELIEF VALVE
15. FILTER-DRIER (DEHYDRATOR)

gloves when performing the followin

(a) Fold a piece of fiber-glass
E-1) about 6 x 6 inches and
the tubing, a few inches aw
to be cleaned.

(b) Heat the tubing at the end
braze filler metal is thoro

(c) Grasp the fiberglass wrappi
over the tubing end with a

(4) Protection from heat.

WARNING

Polyurethane foam insulation breaks
toxic gases when heated to brazing t

(a) When brazing/debrazing refri
fittings near an insulated
ditioner, fabricate a sheet
the flame of the torch away
Perform the operation in a

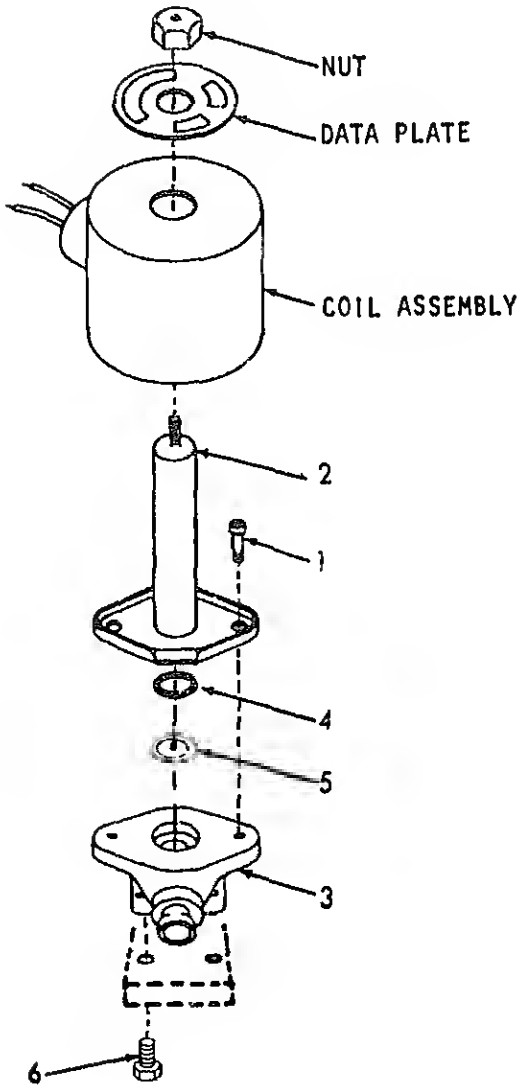
(b) When brazing/debrazing tubi
valves, solenoid valves or
could be warped or damaged
the component should be dis
extent possible, and the bo
If disassembly is impractic
entire component, except fo
heated, should be wrapped i
heat sink.

5-14. SOLENOID VALVE REPLACEMENT.

a. Description.

Two solenoid valves are used in the air c
close/open the liquid refrigerant line from th
evaporator coil expansion valve, the other to
equalization circuit from the discharge side o
suction side. Both valves are alike; however

(2) Solenoid testing (para 4-42.1).



moval.

f it is necessary to replace the tube and plunger assembl
agm and O-ring, or the entire valve, proceed as directed
following procedure:

(para 5-5).

(1) Remove coil assembly as directed in paragraph 4-4

(2) When refrigerant is completely discharged from th system, remove the two screws (1) that fasten the and plunger assembly (2) to the body (3). Remove and plunger assembly (2), O-ring (4), and diaphra and discard.

(3) If valve body is serviceable, install replacement parts. If valve body is warped or is otherwise ur iceable, connect a cylinder of dry nitrogen to th discharge service valve, and establish a flow of (0.1 - 0.2 M^3/min) through the system. Oebraze t valve body from the refrigerant tubing.

(4) Remove two mounting screws (6) attaching the valv to the mounting bracket. Remove the solenoid val body.

nstallation.

(1) If valve body (3) was removed, install new body, to mounting bracket with two screws (6) and attac connections to body, disassembled from remainder

(2) Wrap the body between the tubing connection in we cloth, and start a 1-2 cfm (0.1 - 0.2 M^3/min) flo dry nitrogen (item 8, table E-1) through the syst Braze connections. When cool, remove cloth and c assembly.

(3) Install O-ring (4) in groove in tube and plunger bly (2) and place diaphragm (5) in recess in valv with the metal buffer plate and seat on top.

(4) Carefully place tube and plunger assembly (2) on valve body (3) and secure with two screws (1). uniformly.

(5) Install coil assembly as instructed in paragraph 4-42.2.

(6) Install a new filter-drier as per paragraph 5-15 leak test as directed in paragraph 5-5.

(7) Replace the components removed (para 4-42.1).

Description.

The filter-drier assembly is a metal container which co
drating and filtering media through which the liquid refr
flow from the condenser coil to the evaporator coil. A
er-drier must be installed in the system whenever the sys
opened. The filter-drier is located above and to the r
compressor in the lower part of the air conditioner. It
ected to the refrigerant piping by flare nuts for easy re
allation.

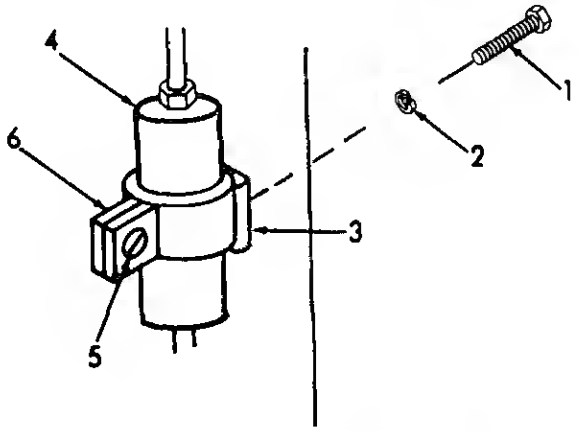
Preliminary Requirements.

(1) Remove lower panel (para 4-12).

(2) Remove junction box (para 4-28).

(3) Remove fresh air screen (para 4-14).

(4) Discharge system (para 5-3).



WARNING

All refrigerant gas must be discharged from the system (para 5-3) before proceeding with the re-

slide the band clamp from the filter-drier.

Installation.

(1) Install a new filter-drier (4) in the band clamp tighten screw (5), in such a way that the directi flow arrow will point up when installed.

(2) Install the filter-drier and band clamp in the ai conditioner, and secure with the screw (1) and wa (2) removed previously. Check again to be sure t direction-of-flow arrow is pointing up.

(3) Connect refrigerant tubing to the flare fittings top and bottom of the filter-drier.

(4) Leak-test in accordance with paragraph 5-5.

(5) Replace the components removed in the preliminary requirements, items 1 and 2.

(6) Test, evacuate, and recharge system as per paragr 5-5 through 5-8.

(7) Remove gauges, and replace caps on service valves

(8) Replace fresh air screen as per paragraph 4-14.

. SIGHT GLASS REPLACEMENT.

Description.

The sight-glass liquid indicator is a circular sealed winc liquid side of the system between the liquid line solenoid the evaporator coil expansion valve. The indicator is loca rear surface of the air conditioner, below the pressure cut ches.

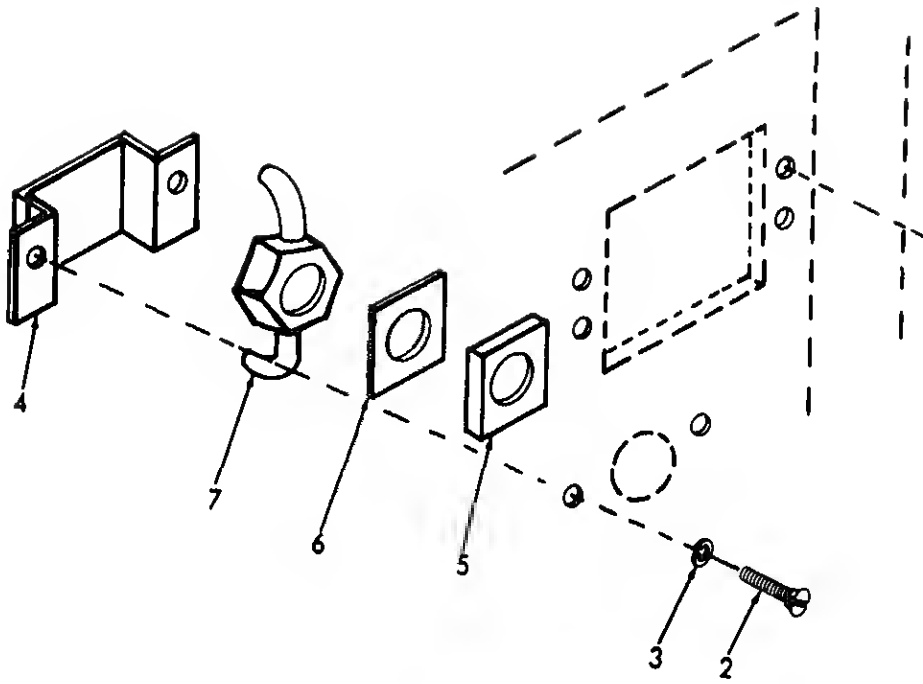
Preliminary Requirements.

(1) Remove fresh air screen (para 4-14).

(2) System discharge (para 5-3).

(3) Remove canvas cover (para 4-8).

(4) Remove top panel (para 4-9).



WARNING

All refrigerant gas must be discharged from the system, and a flow of dry nitrogen connected to th discharge service valve before removing the sight-glass (para 5-3).

Removal.

(1) Remove the four screws (1) from the ends of th switch housing, and move the housing aside to access to the sight-glass liquid indicator.

(2) Remove two screws (2) and lockwashers (3) from sides of the bracket (4) and remove the bracke spacer (5) and gasket (6) from inside the air conditioner.

(3) With dry nitrogen flowing through the system, joints of the sight-glass liquid indicator, re sight-glass (7) from inside the air conditione

Installation

joints to sight-glass liquid indicator.

(4) Install new filter-drier (para 5-15).

(5) Leak-test as directed in paragraph 5-5.

(6) Reinstall the pressure switch housing using scr (1).

(7) Replace the components removed in the prelimina requirements items 3 and 4.

(8) Test, evacuate and recharge system as per parag 5-5 thru 5-8.

(9) Remove gauges, and replace caps on service valv

(10) Replace fresh air screen as per paragraph 4-14

7. PRESSURE REGULATING VALVE.

Description.

The pressure regulating valve is functionally a part of s circuit, and opens when suction pressure drops below a p el. When the valve opens, it bypasses refrigerant gas to n side of the compressor to prevent the formation of low s ssures. If pressure testing indicates that the suction pr of limits, adjustment of the pressure regulating valve wi y correct the trouble. The pressure regulating valve is l the top of the air conditioner, in front of the pressure e enoid and liquid quench expansion valves.

Preliminary Requirements.

ADJUSTMENT

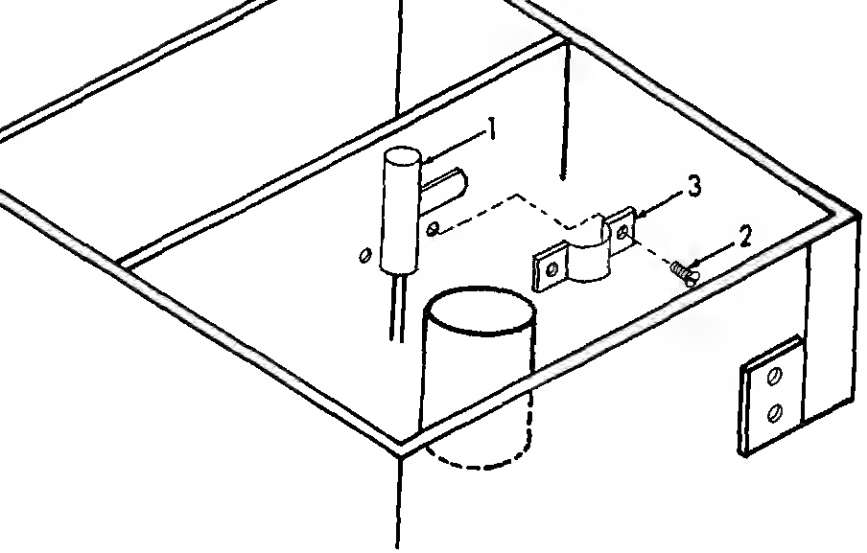
(1) Remove canvas cover (para 4-8).

(2) Remove top panel (para 4-9).

(3) Remove fresh air screen (para 4-14).

(4) Remove condenser fan guard (para 4-16).

(5) Remove condenser fan (para 4-44.2).



/Test.

inspect the pressure regulating valve for physical
for proper operation of the valve by pressure testing
accordance with paragraph 5-8. If minimum suction
t of limits, adjust the pressure regulating valve.

.

e valve by removing the knurled screw-cap from the
ssure regulating valve, and adjusting the internal screw
g the suction line gauge. Turning adjustment clockwise
tion pressure. When the gauge indicates the proper
re, replace the knurled screw-cap snugly on the valve.

WARNING

refrigerant gas must be discharged from the sys-
before removing the valve. Refer to paragraph
for discharge of system.

Connect a cylinder of dry nitrogen (item 8, table E-1)
to the discharge service valve, and initiate a 1-2 cfm
(0.1 - 0.2 M^3/min) flow through the system.

Debraze the two tubing joints at the pressure regulating

Wrap valve in wet cloths to act as a heat

(2) Install pressure regulating valve (1), bra screws (2).

(3) Install new filter-drier (para 5-15).

(4) Leak-test as instructed in paragraph 5-5.

(5) Replace the components removed in the prel requirements.

(6) Test, evacuate, and recharge system as per 5-5 through 5-8.

(7) Remove gauges, and replace caps on service

(8) Replace fresh air screen as per paragraph

(9) Install condenser fan (para 4-44.2).

(10) Install condenser fan guard (para 4-16)

5-18. PRESSURE RELIEF VALVE.

a. Description.

The pressure relief valve is a conventional spring- valve, located on a tee fitting just below the filter-dr relief valve is preset at 540 + 54 psi (38 + 3.8 kg/cm^2) is equipped with 1/4 inch by 18 NPTF Dryseal pipe thread can be screwed into the tee.

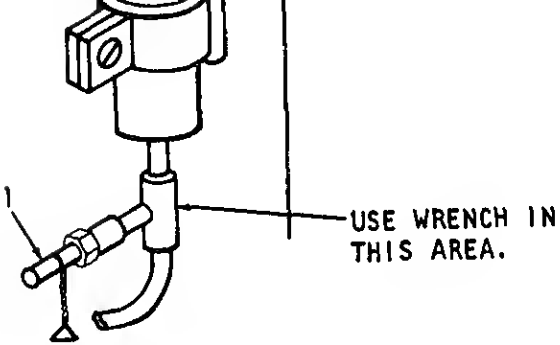
b. Preliminary Requirements.

(1) Remove lower panel (para 4-12).

(2) Remove fresh air screen (para 4-14).

(3) Remove junction box (para 4-28).

(4) Discharge system (para 5-3).



al.

all refrigerant gas has been discharged from the system
nd remove the pressure relief valve (1). Use a back-up
prevent damage to refrigeration system tubing.

llation.

(1) Wrap Teflon pipe tape around the threads of the rep
ment pressure relief valve, and screw the valve int
tee. Use a backup wrench on the tee to prevent dar
when tightening the valve.

(2) Replace the filter-drier (para 5-15).

(3) Leak test as per paragraph 5-5.

(4) Replace the components removed in the preliminary
requirements.

(5) Test, evacuate, and recharge system as per paragra
5-5 thru 5-8.

(6) Remove gauges and replace caps on service valves.

(7) Replace fresh air screen as per paragraph 4-14.

(8) Install junction box (para 4-28).

(9) Install lower panel (para 4-12).

e valves are connection points for pressure and vacuum gau
trogen for purging and leak-testing, and for charging refr
to the system.

Preliminary Requirements.

TESTING

Remove fresh air screen (para 4-14).

REPLACEMENT

(1) Discharge system (para 5-3).

(2) Remove condenser fan guard (para 4-16).

(3) Remove condenser fan (para 4-44.2).

(4) Remove motor support (para 4-17).

(5) Remove CBR cover (para 4-13).

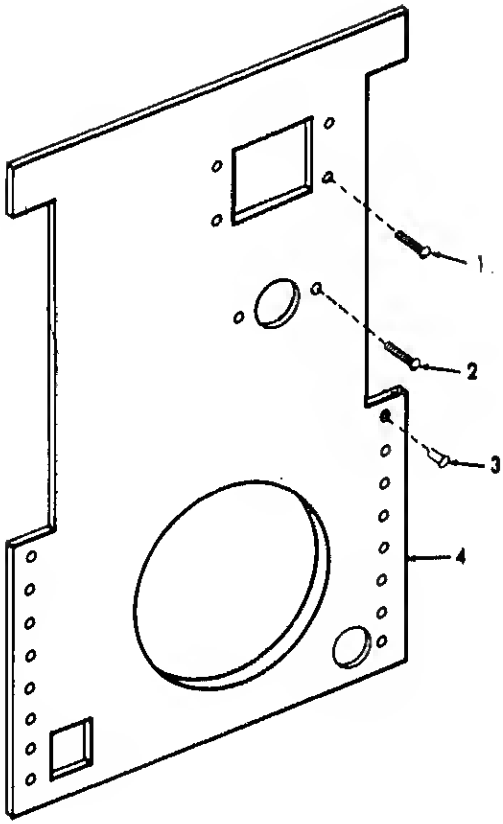
(6) Remove canvas cover (para 4-8).

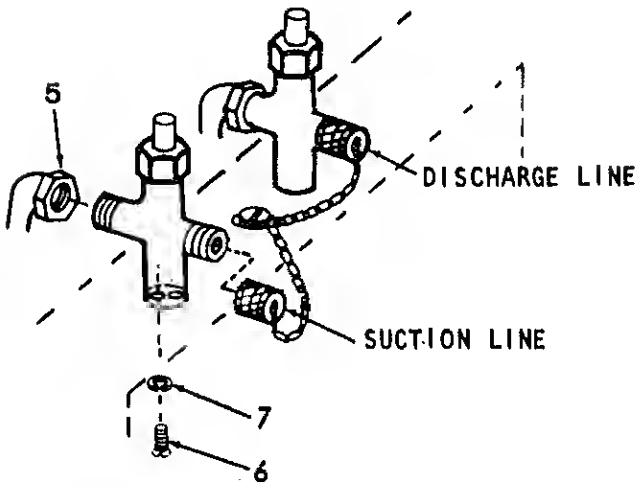
(7) Remove top panel (para 4-9).

(8) Remove condenser coil guard (para 4-15).

Inspection/Test.

Visually inspect the service valves for physical damage
ains and missing caps. Replace missing or broken parts or
lves. Test for leaks, both with caps snugly screwed on an
ps off, in accordance with paragrpah 5-5. If leaks are de
th caps off, the valves are faulty. If leaks are detected
ps on, the flare nut connections are probably faulty.


1
2
3
4


5
1
DISCHARGE LINE
SUCTION LINE
7
6

(2) Remove screws (2) that attach sight glass to pan

(3) Drill out rivets (3).

(4) Pry side of case outward so that panel (4) can b removed.

WARNING

Make sure that all refrigerant gas has been discharged from the system before proceeding (para 5-3)

(5) The inner end of each service valve is connected refrigeration piping with a flare nut (5). Disc by unscrewing the flare nut.

(6) Remove two screws (6) and lock washers (7) that valve body to the floor of the fresh air intake

nstallation.

(1) Screw the flare nut (5) onto the connecting end tight.

(2) Install two screws (6) and lockwashers (7) in ea body through the floor of the fresh air chamber below.

(3) Tighten the flare nuts (5).

(4) Replace panel (4) using rivets (3).

(5) Replace sight glass screws (2).

(6) Replace pressure cut-out switch screws (1).

(7) Replace condenser fan (para 4-44.2).

(8) Replace condenser fan guard (para 4-16).

(9) Replace CBR panel (para 4-13).

(10) Replace top panel (para 4-9).

(11) Replace canvas cover (para 4-8).

(14) Test, evacuate, and recharge the system as per p
5-5 thru 5-8.

(15) Remove gauges and replace caps on service valves

(16) Replace fresh air screen (para 4-14).

CONDENSER COIL REPLACEMENT.

cription.

e condenser coil assembly consists of two coils with a
fins; the condenser coil itself, and the subcooler coil
er coil assembly is located at the bottom rear section
ditioner, and is covered by a grille and screen assembl
it from damage or dirt.

liminary Requirements.

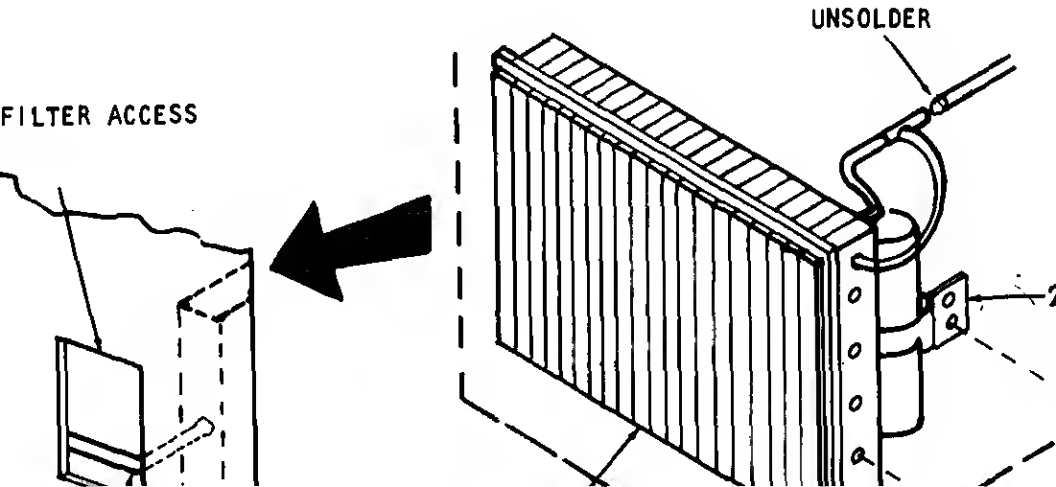
(1) Discharge system (para 5-3).

(2) Remove canvas cover (para 4-8).

(3) Remove condenser coil guard (para 4-15).

(4) Remove RFI filter (para 4-39).

(5) Debrazing (para 5-4).



(2) Remove four screws (3) in a vertical line on ea
of the casing. These screws secure the condens
(4) to the casing.

(3) Provide a 1-2 cfm (0.1 - 0.2M^3/min) flow of dry
nitrogen (item 8, table E-1) through the system
discharge service valve. After three minutes o
gen purging, debraze the tubing as shown in thi
It is not necessary to debraze the receiver at
Withdraw the condenser coil from the air condit

Servicing.

(1) Cleaning

Cap or plug all openings, and tape caps or plug
prevent accidental removal. No water must be p
to enter the coil. When thoroughly sealed, imm
coil in a warm detergent solution for five minu
soak loose caked-on dirt, then agitate the coil
sly in the solution to remove dirt from between
fins. Rinse thoroughly in clear water.

(2) Fin Alignment

If fins are bent or crushed, straighten them wi
or plastic blade so that they are straight and
Badly bent or crushed fins can cause serious di
of airflow, resulting in inefficient operation
air conditioner.

Installation.

NOTE

If the receiver was removed, or a new coil is being
installed, install the receiver to the coil assembl
and braze joints before installing the coil in the
air conditioner.

(1) Position the condenser coil (4) in the air cond
with all tubing joints meeting properly. Secur
coil with four screws (3) through each side of
casing.

(2) Start a flow of 1-2 cfm (0.1 - 0.2 M^3/min) of d
nitrogen (item 8, table E-1) through the system
discharge service valve. After three minutes o
gen purging, braze joints.

side of the air conditioner.

(4) Install a new filter-drier (para 5-15).

(5) Replace the components removed in preliminary requirements items 4 thru 2.

(6) Test, evacuate, and recharge system as per parag 5-5 thru 5-8.

RECEIVER.

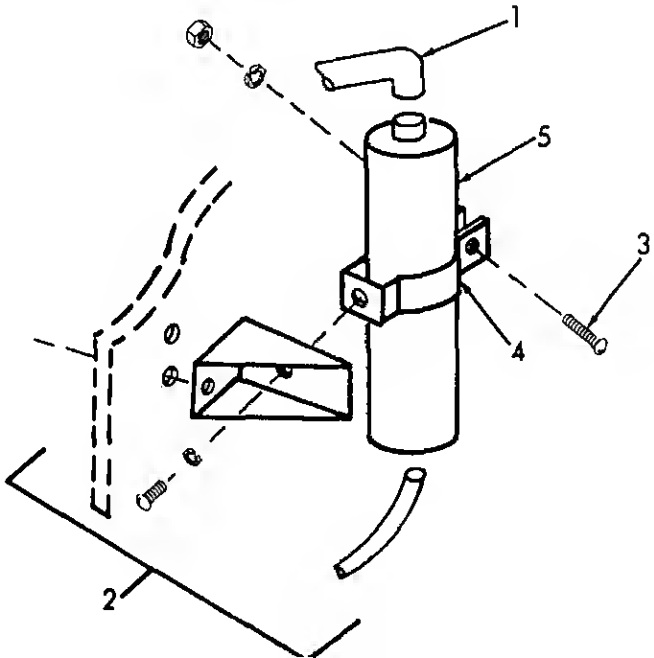
cription.

e receiver is a small cylindrical tank in the line betw er coil and the sub-cooler section of the condenser coi n is to act as a reservoir for liquid refrigerant, whic ilize operation of the refrigeration system. The recei of the left side of the air conditioner, just in front er coil.

liminary Requirements.

(1) Remove condenser coil (para 5-20).

(2) Debrazing (para 5-4).



d. Installation.

(1) Place the receiver (5) in the band clamp tighten the clamping screw (3) finger tig

(2) Make tubing connections (1) from the cond the receiver, and tighten the clamping sc band clamp (4).

(3) Restart the flow of dry nitrogen (item 8, braze tubing joints to the receiver.

(4) Reinstall condenser coil (para 5-20).

5-22. THERMAL EXPANSION VALVE.

a. Description.

Two thermal expansion valves are used in the air c One expansion valve meters (liquid) refrigerant into th coil, through a distributor which disperses the liquid into several parts of the coil. The other expansion va injects liquid refrigerant into the compressor suction the temperature of hot gas in the bypass circuit. Both to temperature changes in the refrigerant suction line remote bulbs are attached. The effects of pressure-dro evaporator coil are cancelled by a pressure equalizatio evaporator thermal expansion valve to the downstream (s the evaporator coil just beyond the sensing bulb. This equalization permits the valve to respond more quickly variations alone. Since pressure-drop in the liquid ci insignificant, the liquid injection expansion valve is externally. Both valves are hermetically sealed to the bulbs and capillary tubes.

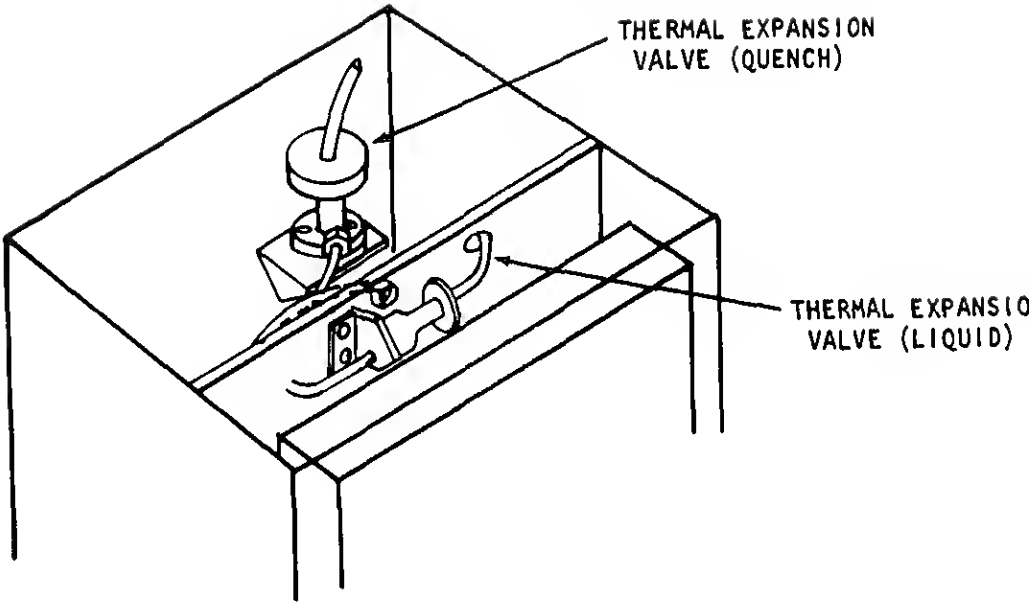
b. Preliminary Requirements.

(1) Remove canvas cover (para 4-8).

(2) Remove top panel (para 4-9).

(3) Remove condenser fan guard (para 4-16).

(4) Remove condenser fan (para 4-44.2).



ting.

(1) Cut insulation away from sensing bulb and band cl
Remove screw from band clamps, and remove sensing

NOTE

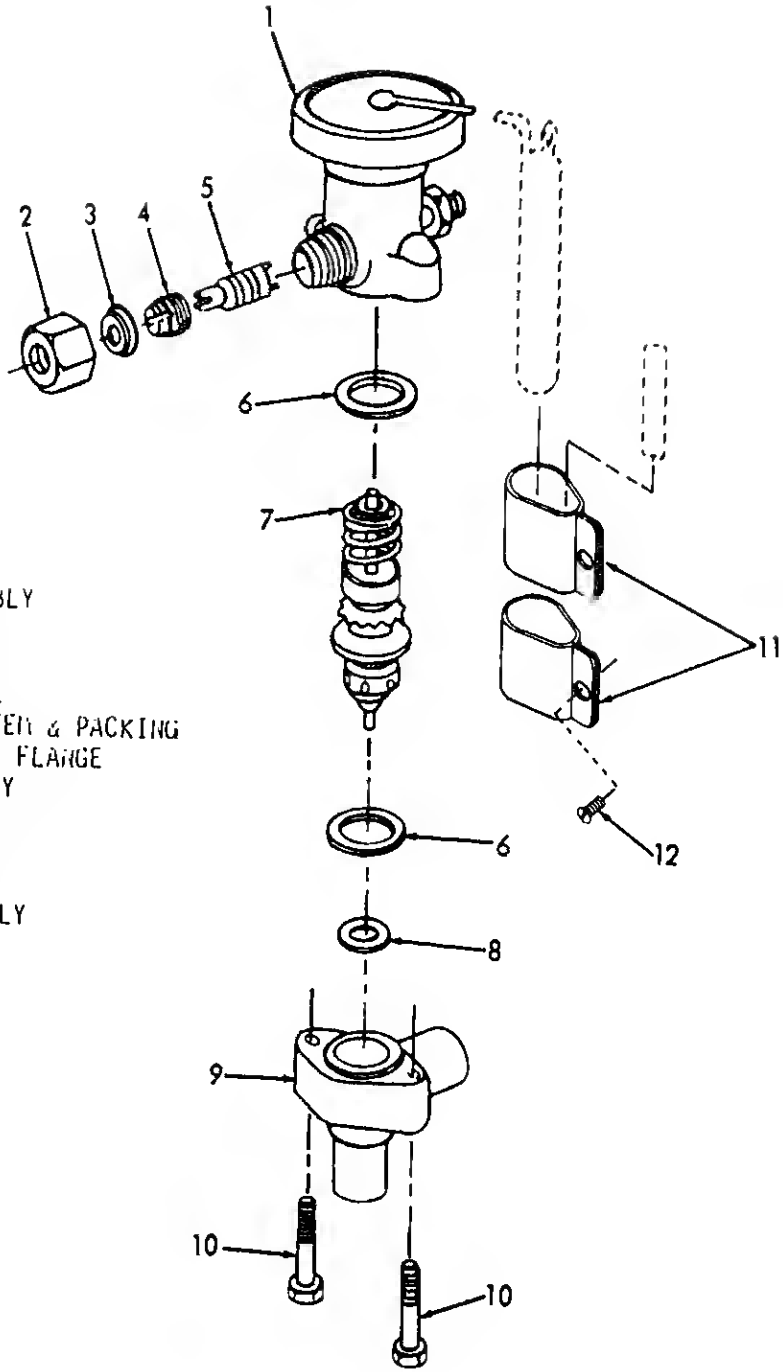
Because the condenser fan impeller and the top panel were removed for access, the condenser coil will be without airflow. Provide temporary airflow for the following test, by placing a high velocity fan or centrifugal blower directly in front of the condenser coil, and as close to it as possible.

(2) With the air conditioner stopped, let the suction warm up to ambient temperature.

(3) Remove the sensing bulb from its location against suction line, and place it in a container of ice or crushed ice (32°F or 0°C). Note position of b on removal and be sure to replace it in the same position.

CAUTION

Do not let liquid refrigerant flood back into the



1. POWER ASSEMBLY
2. CAP, SEAL
3. BONNET SEAL
4. PACKING SEAL
5. ADJUSTING STEM & PACKING
6. GASKET, BODY FLANGE
7. CAGE ASSEMBLY
8. GASKET, SEAT
9. FLANGE, BODY
10. SCREWS, CAP
11. CLAMP ASSEMBLY
12. SCREW

ture drops, the valve is operating properly. Stop t
air conditioner at once, and re-install the sensing
bulb. If the temperature of the suction line does n
drop, stop the air conditioner and replace the expan
valve.

ng Superheat.

igerant gas is said to be superheated when its temperat
han the evaporating temperature corresponding to its pr
uration. When a thermal expansion valve is set for opt
in this case 6^{0}F or 3.3^{0}C above the evaporating temper-
e refrigerant at a given pressure) the evaporator coil
maximum efficiency. That is, the refrigerant gas does
before reaching the end of the coil, which would reduc
cooling capacity, and the refrigerant does not remain i
state after passing completely through the coil, which
t in severe damage to the compressor. The superheat se
hermal expansion valve can be adjusted by varying the s
ompression spring (7) in the power assembly of the valv
tends to hold the valve closed against the pressure in
b and capillary tube; therefore, the greater the spring
he higher the superheat. Check superheat, and adjust i
in accordance with the following procedure:

emove insulation from a spot on the suction line near t
b of the thermal expansion valve to be adjusted.

nstall an accurate thermometer or the probe of a thermo
he bare spot, using a small gob of thermal mastic, if
to improve conductivity. Tape the thermometer bulb or
e junction in position, and cover with insulating mater

onnect a suitable pressure gauge to the suction service
open the valve.

perate the air conditioner in the cooling mode for abou
serving the thermometer or thermocouple dial to see tha
ture has stabilized. When the temperature remains unch
east two minutes, record the temperature and pressure.

ompare the recorded temperature and pressure with those
Each expansion valve should register higher than the
he Table by the following amount.

Evaporator expansion valve: $6^{0} \pm 1.5^{0}$F or $3.3^{0} \pm 0.8^{0}$

Quench expansion valve: $30.4^{0} \pm 0.5^{0}$F or $16.7^{0} \pm 0.3^{0}$

Deg F	Deg C	Psig	kg/cm²	Deg F	Deg C	P
10	-12.3	32.93	2.315	66	18.9	11
12	-11.1	34.68	2.439	68	20.0	11
14	-10.0	36.89	2.593			
16	- 8.9	38.96	2.739	70	21.1	12
18	- 7.8	41.09	2.889	72	22.2	12
				74	23.3	13
20	- 6.6	43.28	3.043	76	24.4	13
22	- 5.5	45.23	3.180	78	25.6	14
24	- 4.3	47.85	3.364			
26	- 3.4	50.24	3.532	80	26.7	14
28	- 2.2	52.70	3.705	82	27.8	14
				84	28.9	15
30	- 1.1	55.23	3.883	86	30.0	15
32	0	57.83	4.066	88	31.1	16
34	1.1	60.51	4.254			
36	2.2	63.27	4.448	90	32.2	17
38	3.3	66.11	4.648	92	33.3	17
				94	34.5	18
40	4.4	69.02	4.853	96	35.6	18
42	5.5	71.99	5.062	98	36.7	19
44	6.6	75.04	5.276			
46	7.7	78.18	5.497	100	37.8	19
48	8.8	81.40	5.723	102	38.9	20
				104	40.0	20
50	10.0	84.70	5.955	106	41.1	21
52	11.1	88.10	6.257	108	42.2	22
54	12.2	91.5	6.433			
56	13.3	95.1	6.686	110	43.3	22
58	14.5	98.8	6.947	112	44.4	23
				114	45.6	24
60	15.6	102.5	7.206	116	46.7	24
62	16.7	106.3	7.474	118	47.8	25
64	17.8	110.2	7.748			

(6) If the superheat setting is not within the limits
above (higher than the values in Table 5-3), adjust the exp
valve as follows:

(a) Remove the hexagonal seal cap (2) from the side
power assembly (1), and loosen the bonnet seal (3).

(b) Turn the adjusting stem (5) two complete turns
superheat of one degree F. Turn clockwise to raise, and co
wise to lower, the superheat setting. Do not turn more tha

lve, remove the pressure gauge, and install the cap on t
lve gauge port.

1.

1) Discharge system (para 5-3).

2) Remove insulation and band clamp from sensing bulb. Carefully detach bulb and capillary tube.

3) Remove two capscrews (10) securing the power assemb (1) to the valve body (9). Remove the power assemb capillary tube and sensing bulb.

4) Detach equalizer line, on liquid expansion valve. applicable to quench valve.

CAUTION

Maintain a 1-2 cfm (0.1 - 0.2M^3/min) flow of dry nitrogen (item 8,table E-1) through the refrigeration system to prevent oxidation and scaling when brazing or debrazing components.

5) Debraze (para 5-4).

6) Remove valve body (9).

lation.

1) Disassemble the new valve by removing two capscrews that secure the power assembly (1) to the valve body (9), and separate the two.

2) With dry nitrogen (item 8, table E-1) flowing throug the refrigeration system braze tubing joints. Let Tighten capscrew.

3) Install the valve body in the support bracket, and secure with two capscrews (10), finger tight. Conn tubing.

4) Install power assembly (1) on valve body, being car to fit lugs on the cage assembly (7) into the cavit in the body (9). Secure with two capscrews (10). Connect equalizer line, on liquid expansion valve.

suction line. Clamp in position to the suctio
Cover suction line, sensing bulb and clamp wit
insulating material.

(7) Carefully form the capillary tube along adjace
and tape to support.

(8) Leak-test in accordance with paragraph 5-5.

(9) Replace filter-drier (para 5-15).

(10) Test, evacuate, and recharge system as per par
5-5 thru 5-8.

(11) Reinstall components removed in the preliminar
requirements.

(12) Remove gauges and replace caps on service valv

(13) Replace fresh air screen (para 4-14).

23. EVAPORATOR COIL REPLACEMENT.

Description.

The evaporator coil receives liquid refrigerant from th
on valve, and evaporates the liquid to a gas by absorbing
e airflow passing over the outside surface of the coil. T
ator coil is located in the top front section of the air c

Preliminary Requirements.

(1) Remove canvas cover (para 4-8).

(2) Remove top panel (para 4-9).

(3) Remove air discharge grille (para 4-10).

(4) Remove mist eliminator (para 4-20).

(5) Remove heating elements (para 4-43.1).

(6) Remove condenser fan guard (para 4-16).

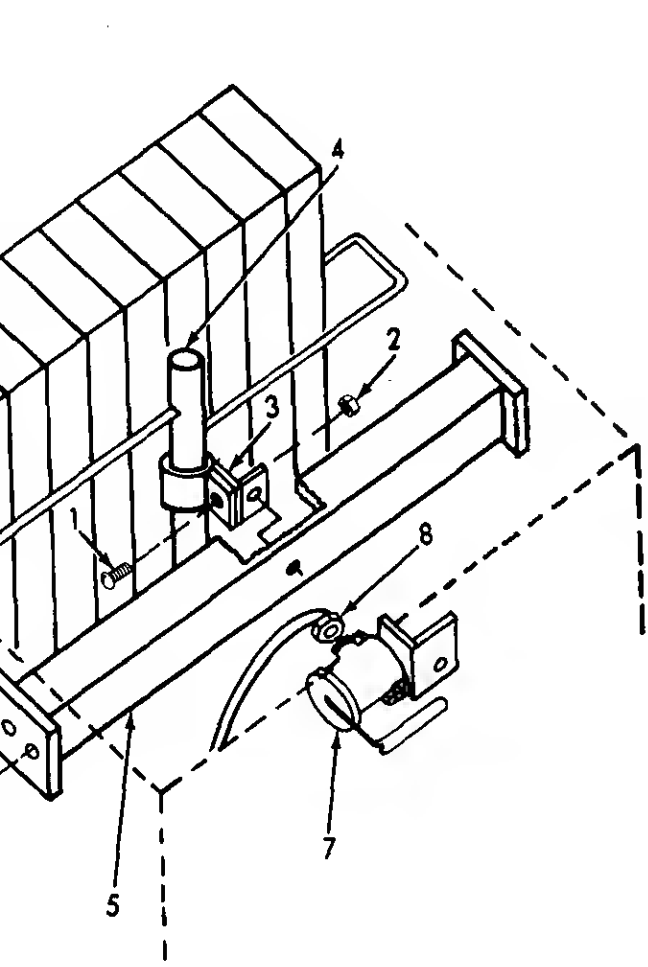
(7) Remove condenser fan (para 4-44.2).

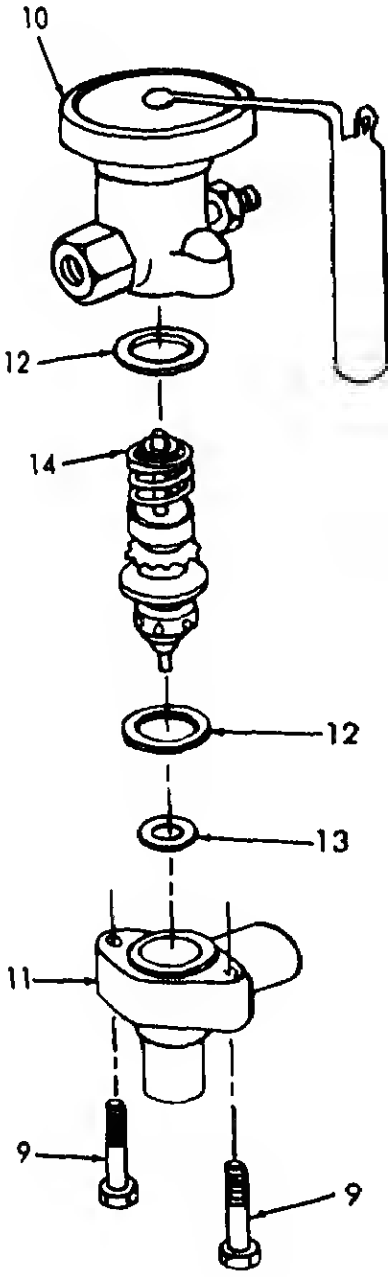
(8) Remove air intake grille (para 4-11).

(9) Remove air intake filter (para 4-18).

1) Discharge system (para 5-3).

2) Debraze (para 5-4).





1.

1) Remove screw (1) and nut (2) that attaches clamp pipe (4).

valve body at this time.

(a) Unscrew the equalizer tube flare nut (8) from t power assembly of the valve.

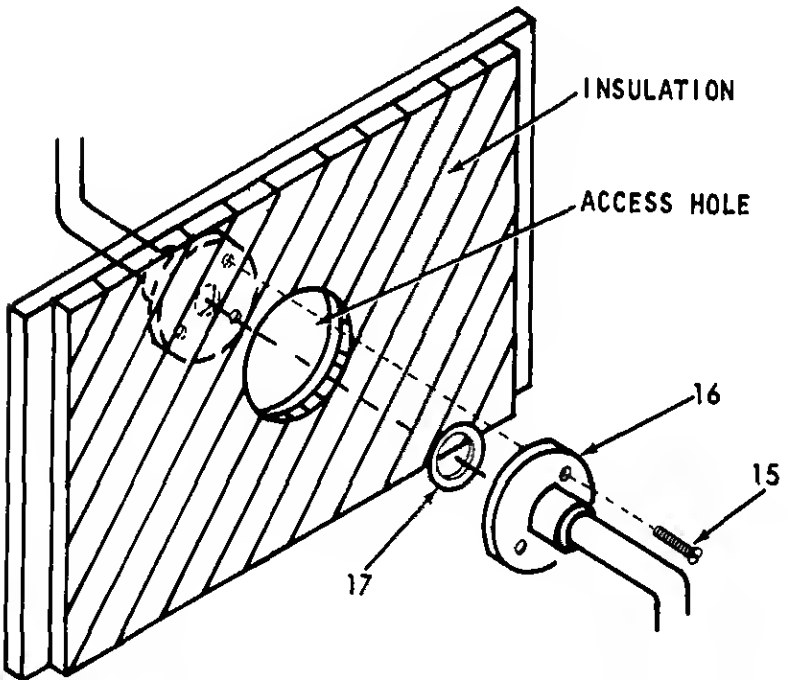
(b) Remove two mounting screws (9), from the bracke and valve body. Carefully separate the power a sembly (10) from the valve body (11), and remov gaskets (12 and 13) and cage assembly (14).

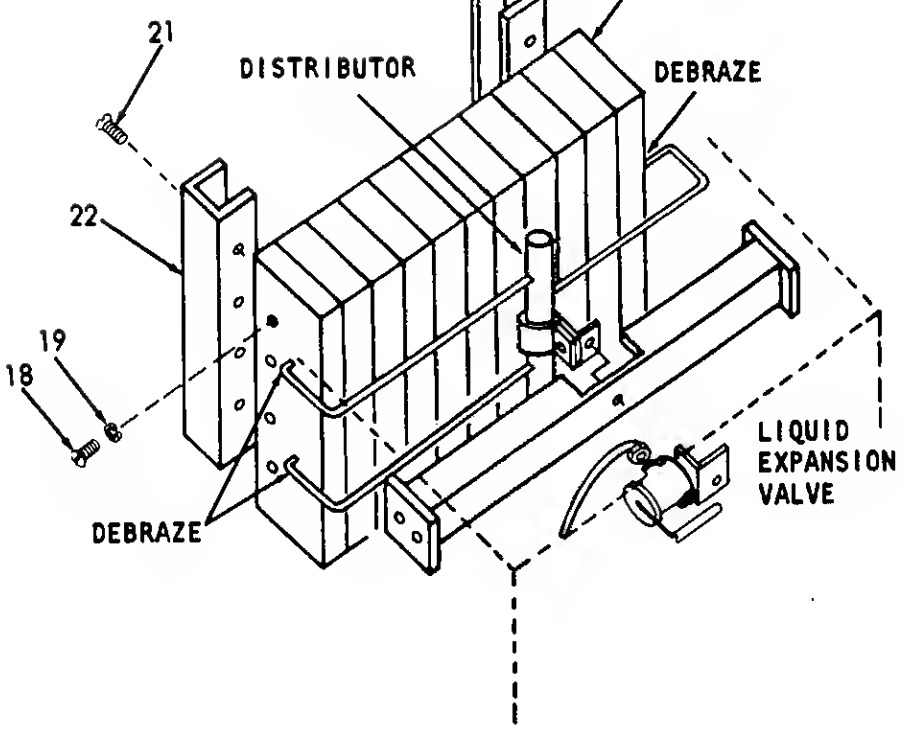
(c) Provide a flow of 1-2 cfm (0.1 - 0.2 M^3/min) of dry nitrogen (item 8, table E-1) through the sy from the discharge service valve for at least t minutes, then debraze the liquid line from the expansion valve.

(4) Remove condenser fan baffle if required (see para 4-

(5) Accessing through the condenser fan, remove insulat around flange.

(6) Remove three capscrews (15) from the rear of the suction line flange connection (16) and separate the two halves of the flange connection slightly. Remove and discard the O-ring (17).





vicing.

Cleaning

Cap or plug all openings, and tape caps or plugs to pr
accidental removal. No water must be permitted to ent
coil. When thoroughly sealed, immerse the coil in war
ergent solution for five munutes to soak loose caked-o
then agitate the coil vigorously in the solution to re
dirt from between the fins. Rinse thoroughly in clear

Fin Alignment

If fins are bent or crushed, straighten them with a wo
plastic blade so that they are straight and parallel.
bent or crushed fins can cause serious distortion of a
resulting in inefficient operation of the air conditio

assembly.

If a new coil is to be installed, debraze the distribu
assembly from the old coil at three places. Remove mi
eliminator retainer channels (22) from the coil by rem
four screws (21) from each channel.

(4) Place evaporator coil (20) in position.

(5) Install a new O-ring (17) in the groove of the suc line connecting flange (16) and assemble the halve the flange. Secure with three capscrews (15 from back of the partition. Replace insulation.

NOTE

If a new liquid line expansion valve body is to be installed, braze the distributor body into the discharge port of the expansion valve before assembling the valve.

(6) Position the liquid line expansion valve body (11) its support bracket, and align by securing with tw screws (9) and slave nuts. Do not install power assembly at this time. Braze liquid line to valve body.

(7) Install new gaskets (12) and seat (13) in valve bo

(8) Place cage assembly (14) in power assembly (10), r screws (9) and fit bosses of cage assembly into re in valve body. Secure power assembly (10) to valv (11) with screws (9). Connect the equalizer line nut.

(9) Install screws (18) and washers (19) that secure e ator coil (20) to air conditioner.

(10) Install evaporator fan (para 4-44.1).

(11) Install condenser fan (para 4-44.2).

(12) Install air intake filter (para 4-18).

(13) Install air intake grille (para 4-11).

(14) Install heater mounting bracket (5) using rivets

(15) Install clamp (3) to pipe (4) using screw (1) and (2).

(16) Install heating elements (para 4-43.1).

(17) Install a new filter-drier (para 5-15).

(20) Install the mist eliminator by sliding it straight in the channels in front of the evaporator coil. sure that TOP mark is up, and that airflow arrows outward (refer to para 4-20).

(21) Replace components removed in preliminary requirem items 3, 2, 1.

ERAL.

chapter is for the use of general support maintenance pe
This chapter contains maintenance procedures for the casi

Section II. MAINTENANCE PROCEDURES

ING ASSEMBLY.

iption.

casing assembly supports or surrounds all functional comp
the air conditioner. Therefore, if damage is extensive
require replacement of the casing assembly, it is also
enough to have caused significant damage to major compor
case it is necessary to procure a new casing assembly, a
le the damaged unit completely, test all components, and
erviceable components in the new casing. Unserviceable
s must be replaced.

ction.

ect the casing assembly for dents, gouges, cuts or tears,
ormation. Remove panels as necessary to determine whethe
components such as coils, wiring, piping or other compone
stems have been damaged. If damage is apparent, leak-tes
of the refrigeration system and make an operating check
and functional components. If the unit is functionally U
e casing.

.

ghten dents by using a sheet-metal hammer and back-up do
e to avoid stretching the metal more than necessary. Fil
h body putty, fiberglass-epoxy filler, or weld. Weld cu
f possible, or fabricate a patch and attach it with blir
Sand paint to a feather edge around the repair, and paint
n TM 43-0139.

Inspection.

Inspect insulation for areas of looseness or separation f
l panel, and for missing areas. Replace damaged or missin
lation.

Removal.

WARNING

Acetone (item 1, table E-1) and methyl-ethyl ketone (MEK) (item 7, table E-1) are flammable, and their vapors are explosive. Prolonged or repeated inhalation of fumes or contact with the skin can be toxic. Use in a well ventilated area, wear gloves, and keep away from sparks or flame.

Scrape or pull off as much of the damaged insulation as p
en the remaining insulation and adhesive with acetone or M
m 1 or 7, table E-1) and remove with a putty knife, paint
imilar tool. Repeat the softening and scraping process as
ired, then clean up the metal surface with a cloth moisten
one or MEK.

Installation.

Cut a sheet of the proper insulating material to the corr
e, and coat the attaching side with adhesive (item 2, tabl
g a brush to ensure complete coverage. Also, brush adhesi
metal to which the insulation is to be attached. Let both
aces air-dry until the adhesive become tacky but will not
k to the fingers. Starting at one corner or at a narrow e
fully bring the insulation into full contact with the meta
s into firm contact all over.

5-4200-200-10	Hand Portable Fire Extinguish for Army Users.

INTING

43-0139	Painting Instructions for Fie Use.

INTENANCE

38-750	Army Equipment Record Procedu
5-764	Electric Motor and Generator Repair.
5-4120-344-24P	Organizational, Direct Suppor General Suppport Maintenance Repair Parts and Special Too List.

IPMENT AND STORAGE

740-90-1	Administrative Storage of Equ ment.

STRUCTION OF ARMY EQUIPMENT

750-244-3	Procedures for Destruction of ment to Prevent Enemy Use.

Section II. Components of End Item. This listing is for
nal purposes only, and is not authority to requistion
ts. These items are part of the end item, but are remove
tely packaged for transportation or shipment. As part of
em. these items must be with the end item whever it is
transferred between property accounts. Illustrations are
to assist you in identifying the items.

Section III. Basic Issue Items. These are the minimum
items required to place the air conditioner in operation,
, and to preform emergancy repairs. Although shipped
packaged BII must be with the air conditioner during
and whenever it is transferred between property accounts.
rations will assist you with hard-to-identify items. Thi
your authroity to request/requistion replacement BII, bas
E authorization of the end item.

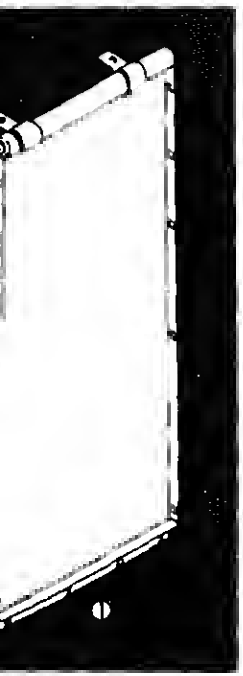
ANATION OF COLUMNS.

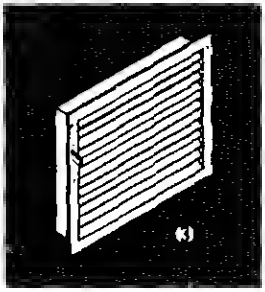
following provides an explanation of columns found in the
stings:

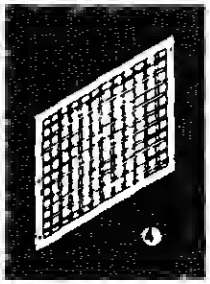
Column (1) - Illustration Number (Illus Number). This
icates the number of the illustration in which the item i

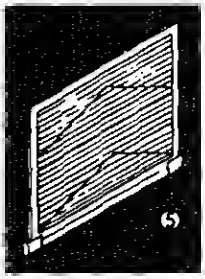
Column (2) - National Stock Number. Indicates the Nation
er assigned to the item and will be used for requistionin

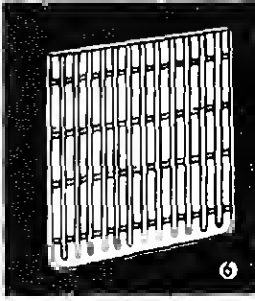
Column (3) - Description. Indicates the National item na
quired, a minimum description to identify and locate the
last line for each item indicates the FSCM (in parenthes
the part number.

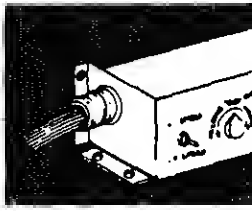












) S ER	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION FSCM and PART NUMBER	(4 U/
	4130-01-051-7425	Cover, Air Conditioner (97403) 13217E2346	
	5935-00-846-2328	Connector, Plug, Electrical (96906) MS3106R22-22S	
	4130-01-047-8362	Grille Assy, Intake (97403) 13215E9857	
	4120-01-054-6534	Grille Assy Discharge (97403) 13215E9857	
	4130-01-011-1217	Mist Eliminator (97403) 13219E2647	
		Guard, Condenser (97403) 13215E9867	

Section I. INTRODUCTION

eral

This section provides a general explanation of all maint
epair functions authorized at various maintenance levels

Section II designates overall responsibility for the per
aintenance functions on the identified end item or compo
rk measurement time required to perform the functions by
maintenance level. The implementation of the maintenar
upon the end item or components will be consistent with
aintenance functions.

Section III lists the tools and test equipment required
enance function as referenced from Section II (Not
).

LANATION OF COLUMNS IN SECTION II.

Column (1), Group Number. Column 1 lists group numbers
elated components, assemblies, subassemblies, and module
next higher asembly. The applicable groups are listed
disassembly sequence beginning with the first group

Column (2), Component/Assembly. This column contains th
of components, assemblies, subassemblies, and modules f
tenance is authorized.

Column (3), Maintenance Functions. This column lists th
to be performed on the item listed in Column 2. The ma
nctions are defined as follows:

(1) Inspect. To determine serviceability of an item
its physical, mechanical, or electrical characteristics
d standards through, examination.

(2) Test. To verify servicability and to detect in-
ilure by measuring the mechanical or electrical characte
an item, and comparing those characteristics with prescr

(3) Service. Operations required periodically to kee
oper operating condition, i.e., to clean (decontaminate)
to drain, to paint, or to replenish fuel, lubricants,

(5) Align. To adjust specified variable elemen
em to bring about optimum or desired performance.

(6) Calibrate. To determine and cause correcti
de or to be adjusted on instruments or test measuring and
uipments used in precision measurement. Consist of compar
o instruments, one of which is a certified standard of kno
curacy to detect and adjust any discrepancy in the accurac
strument being compared.

(7) Install. The act of emplacing, seating, or
to position an item, part, or module (component or assembl
nner to allow the proper funtioning of an equipment or sys

(8) Replace. The act of subsituting a servicab
be part, subassembly or module (component or assembly) for
servicable counterpart.

(9) Repair. The application of maintenance ser
nspect, test, service, adjust, align, calibrate, or replac
ner maintenance actions (welding, grinding, riveting, stra
g, facing remachining or resurfacing) to restore serviceab
item by correcting specific damage, fault, malfunction, o
a part, subassembly, module (component or assembly), end
stem.

(10) Overhaul. That maintenance effort (service
cessary to restore an item to a completely serviceable/ope
ndition as prescribed by maintenance standards in appropri
cal manuals. Overhaul is normally the highest degree of m
rformed by the Army. Overhaul does not normally return an
ke-new condition.

(11) Rebuild. Consists of those services/action
ry for the restoration of unserviceable equipment to a lik
ndition in accordance with organizational manufacturing st
build is the highest degree of material maintenane applied
ipment. The rebuild operation includes the act of return
o those age measurements (hours/miles, etc.) considered i
ving Army equipments/components.

d. Column (4), Maintenance Level. This column is mad
columns for each category of maintenance. Work time figu
ted in these subcolumns for the lowerst level of maintena
horized to perform the function listed in Column 3. Thes
licate the average active time required to perform the mai
action at the indicated category of maintenance under typi
erating conditions.

Column (6), Remarks. Not Applicable

ANATION OF COLUMNS IN SECTION III.

Column (1), Reference Code. The tool and test equipment code correlates with a maintenance function on the ider item or component.

Column (2), Maintenance Level. The lowest level of main thorzed to use the tool or test equipment.

Column (3), Nomenclature. Name or identification of the st equipment.

Column (4), National/NATO Stock Number. The National or number of the tool or test equipment.

Column (5), Tool Number. The manufacturer's part number

AIR CONDITIONER, 18,000 BTU/HR

(1) GROUP NUMBER	(2) COMPONENT/ ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE LEVEL C	O	F	H	D	(5) TOOLS AND EQUIPMENT	REM
01	CASING AND RELATED PARTS								
	Canvas Cover	Inspect	0.1						
		Install	0.1						
		Replace		0.2					
	Top Panel Assembly	Replace		0.3					
	Gasket	Replace		1.3					
	Insulation	Replace		1.3					
	Air Discharge Grille	Inspect		0.1					
		Service		0.1					
		Replace		0.2					
		Repair		0.3					
	Gasket	Replace		1.3					
	Air Intake Grille	Inspect		0.1					
		Service		0.1					
		Replace		0.2					
	Gasket	Replace		1.3					
	Lower Panel	Replace		0.2					
		Repair		1.3					
	Gasket	Inpsect		0.1					
		Replace		1.3					
	Insulation	Inspect		0.1					
		Replace		1.3					
	CBR Cover	Replace		0.1					
	Fresh Air Screen	Inspect		0.1					
		Service		0.2					
		Replace		0.2					
	Condenser Coil Guard	Inspect		0.1					
		Service		0.2					
		Replace		0.2					

*Subcolumns are follows: C - Operator/Crew; O - Organizational
F- Direct Support H - General Support D - Depot

**Indicates WT/MH Required.

01	CASING AND RELATED PARTS (continued)						
	Condenser Fan Guard	Inspect		0.1			
		Service		0.1			
		Replace		0.2			
	Motor Support	Replace		3.0			
	Air Filter	Inspect		0.1			
		Service		0.2			
		Replace		0.1			
	Fresh Air Damper Control	Inspect		0.1			
		Adjust	0.1				
		Replace		0.5			
		Repair		1.0			
	Mist Eliminator	Inspect		0.3			
		Service		0.4			
		Replace		0.4			
	Block-off Panel	Install		0.5			
	Instruction Plates	Replace		1.0			
	Casing Assembly Insulation	Inspect		0.1			
		Replace				8.0	
	Drip Pan Assembly	Inspect		0.1			
		Service		0.3			
	Lower Drain Tube Assembly	Inspect		0.1			
		Service		0.3			
		Repair		0.4			

*Subcolumns are as follows: C - Operator/Crew O - Organizational
F - Direct Support H - General Support D - Depot

**Indicates WT/MH Required.

(1) GROUP NUMBER	(2) COMPONENT/ ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE LEVEL C	O	F	H	D	(5) TOOLS AND EQUIPMENT	REMA
02	CONTROL PANEL AND JUNCTION BOX								
	Rotary Selector Switch	Test		0.4					
		Replace		0.5					
	Temperature Control and thermostat	Test		0.4					
		Replace		0.5					
	Two Speed Fan Switch	Test		0.4					
		Replace		0.5					
	Fuse Replacement	Test		0.2					
		Replace		0.2					
	Circuit Breaker	Test		0.4					
		Replace		0.5					
	Heater Motor Relay	Test		0.4					
		Replace		0.5					
	Compressor Motor Relay	Test		0.4					
		Replace		0.5					
	Time Delay Relay	Test		0.4					
		Replace		0.5					
	Relay Armature	Test		0.4					
		Replace		0.5					
	Transformer	Test		0.4					
		Replace		0.5					
	Terminal Boards	Inspect		0.4					
		Replace		0.5					
	Electrical Receptacles	Inspect		0.5					
		Replace		1.0					

*Subcolumns are as follows: C - Operator/Crew O - Organizational
F - Direct Support H - General Support D - Depot

**Indicates WT/MH Required.

(2) COMPONENT/ ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE LEVEL C	O	F	H	D	(5) TOOLS AND EQUIPMENT	(6) REMARKS
Rectifier Assy	Test		0.4					
	Replace		0.5					
RFI Filter Assembly	Test		1.0					
	Replace		1.3					
COMPRESSOR ASSEMBLY								
Compressor	Test		0.4					
	Replace			8.0				
Compressor Crankcase Heater	Test		0.4					
	Replace		0.5					
PRESSURE SWITCHES								
High and Low Pressure Cut-Out Switches	Test		0.4					
	Replace			4.3				
Pressure Control Switch	Test		0.5					
	Replace			4.3				
REFRIGERANT COMPONENTS								
Refrigerant Tubing and Fittings	Inspect			0.2				
	Test			1.0				
	Replace			4.3				
Solenoid Valves	Test		0.4					
	Replace			4.3				
Coil	Test		0.4					
	Replace		0.5					
Filter-drier (Dehydrator)	Replace			4.0				

lumns are as follows: C - Operator/Crew O - Organizational
F Direct Support H - General Support D - Depot

cates WT/MH Required.

(1) GROUP NUMBER	(2) COMPONENT/ ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE LEVEL C	O	F	H	D	(5) TOOLS AND EQUIPMENT	REM
05	REFRIGERANT COMPONENTS - continued								
	Sight-glass Liquid Indicator	Inspect		0.1					
		Replace			5.0				
	Pressure Regulating Valve	Adjust			2.0				
		Replace			4.3				
	Pressure Relief Valve	Replace			4.3				
	Service Valves	Inspect			0.2				
		Replace			4.3				
	Receiver	Replace			4.5				
	Thermal Expansion Valves	Test			2.0				
		Adjust			2.0				
		Replace			4.5				
	Condenser Coil	Service		1.3					
		Replace			8.0				
	Evaporator Coil	Service		1.3					
		Replace			8.0				
06	HEATER ASSEMBLY								
	Electrical Heating Elements	Test		1.5					
		Replace		2.0					
	Heater Thermostatic Switch	Test		0.5					
		Replace		1.0					

*Subcolumns are as follows: C - Operator/Crew O - Organizational
F - Direct Support H - General Support D - Depot

**Indicates WT/MH Required.

(2) COMPONENT/ ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE LEVEL C	O	F	H	D	(5) TOOLS AND EQUIPMENT	(6) REMARKS
FANS AND MOTORS								
Evaporator Fan Assembly	Inspect		0.4					
	Replace		2.0					
Condenser Fan Assembly	Inspect		0.4					
	Replace		2.0					
Fan Motor	Inspect		0.3					
	Test		0.4					
	Replace		2.0					
	Repair		3.5					
WIRING HARNESS								
Wiring Harnesses	Inspect		0.4					
	Test		0.5					
	Replace		1.3					
	Repair		1.5					
Wire Leads	Inspect		0.2					
	Test		0.3					
	Replace		1.0					
	Repair		1.0					
Receptacle Connectors	Inspect		0.2					
	Test		0.3					
	Replace		1.3					
Plug Connectors	Inspect		0.2					
	Test		0.3					
	Replace		1.3					

lumns are as follows: C - Operator/Crew O - Organizational
- Direct Support H - General Support D - Depot

ates WT/MH Required.

	No special tools and test equipmenet required. Standard tools and test equipment in the following kits are adequate to accomplish the maintenance functions listed in Section II.	
F	Tool kit, service, refrigeration unit (SC 5180-90-CL-N18)	5180-00-597-1474
0	Soldering Gun Kit	3439-00-930-1638

SCOPE.

This appendix list additional items you are authorized f
t of the air conditioner.

GENERAL.

This list identifies items that do not have to accompany
nditioner and that do not have to be turned in with it.
are authorized to you by CTA, MTOE, TDA or JTA.

EXPLANATION OF LISTING

National stock number, description, and quantities are p
p you identify and request the additional items you requ
t this equipment. "Usable On " codes are identified as

CODE	USED ON

Not Applicable

Section II. ADDITIONAL AUTHORIZATION LIST

Not Applicable

Section I. INTRODUCTION

OPE.

is appendix lists expendable supplies and materials you w
operate and maintain the air conditioner.

ese items are authorized to you by CTA 50-97U, Expendable
xcept Medical, Class V, Repair Parts and Heraldic Items).

PLANATION OF COLUMNS

Column 1, Item Number. This number is assigned to the
the listing and is referenced in the narrative instructi
ify the material (e.g., "Use cleaning compound, item 5,

Column 2, Level. This column identifies the lowers lev
enance that requires the listed item.

C - Operator/Crew
O - Organizational Maintenance
F - Direct Support Maintenance
H - General Support Maintenance

Column 3, National Stock Number. This is the National
mber assigned to the item; use it to request or requisti

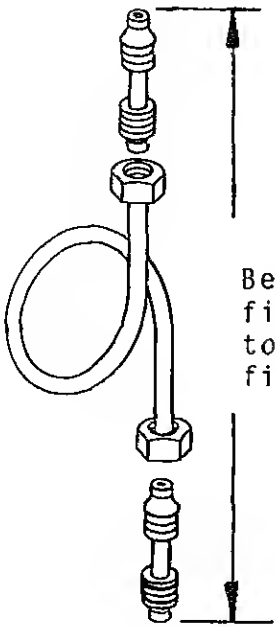
Column 4, Description. Indicates the Federal item name
required, a description to identify the item. The last l
item indicates the part number followed by the Federal
ode for Manufacturers (FSCM) in parenthesis, if applicabl

Column 5, Unit of Measure (U/M). Indicates the measure
performing the actual maintenance function. This measure
d by a two-character alphabetical abbreviation (e.g., ea,
the unit of measure differs from the unit of issue, requ
lowest unit of issue that will satisfy your requirements

BER	LEVEL	NUMBER	
	H		ACETONE
	F,H	8040-00-664-4318	ADHESIVE Type MMM-A-1617 Type II
	O,F		DRY CLEANING SOLUTION (PD-680)
	F		FIBERGLASS CLOTH
	F	4130-00-860-0042	FILTER-KOTE
	F		INSULATING TAPE
	H		METHYL-ETHYL-KETONE (MEK)
	F		NITROGEN (Dry)
	F		OIL (MIL SPEC O- 2104)
	F		REFRIGERANT (R11)
	F		REFRIGERANT (R22)
	F		SOLDER (Spec QQ-S-571)

enance.

All bulk materials needed for manufacture of an item is
art number or specification number on the illustration.



otes:

1. Dimensions in ( ) are centimeters.
2. Fabricate from one foot of tube, copper, seamless ASTM-B-280-3/8.
3. Use two 3/8 copper male fittings.

Figure F-1. Filter-Dryer By-Pass Assembly.

e wiring diagram for the air conditioner is shown in Fig

FRIGERANT SYSTEM DIAGRAM

e refrigerant system diagram for the air conditioner is
e FO-2.

condense into high pressure liquid refrigerant.

SE HEATER - Prevents migration of liquid refrigerant int
compressor in cold weather.

TOR - Cools and dehumidify air before it enters the room

DRIER - Removes any traces of moisture from the refriger
system.

- Provides heat during cold weather operation.

ESSURE CUTOUT - Interrupts power to the compressor when
refrigerant system pressure becomes too high.

LINE SOLENOID - Opens or closes the liquid refrigerant l
from the condenser coil to the evaporator coil expa
valve.

THERMAL EXPANSION VALVE - Injects liquid refrigerant int
recirculating gas in the bypass circuit to maintain
temperature of the gas below its extreme limit.

SSURE CUTOUT - Interrupts power to the compressor when t
refrigerant system pressure becomes too low.

E CONTROL - A switch which automatically adjusts fan spe
compressor discharge pressure.

E EQUALIZER SOLENOID - Opens or closes the pressure equa
circuit from the discharge side of the compressor t
suction side.

THERMAL EXPANSION VALVE - Meter liquid refrigerant into
evaporator coil distributer

R - A reservoir for liquid refrigerant which tends to st
operation of the refrigeration system.

TER - A device that provides a low-resistance path to gr
for stray currents, such as ignition and high frequ
wiring.

VALVES - Valves for suction and discharge when air cond
refrigerant is being tested and serviced.

LASS - A diagnostic tool to observe refrigerant flow and
refrigerant level.

on, List of 1-6
Control, Fresh 4-19
arge Grille 4-10
..... 4-18
e Grille 4-11
, Fresh 4-14
Relay (K4 and K5) 4-34

..... 6-2
er Fan ..... 4-44.
..... 4-23.
ain Tube ..... 4-23.
er (CR1) 4-38
cer 4-39
el 4-9

B

Panel 4-21

C

ver 4-8
es and Features 1-8
sembly 6-2
..... 4-13
he System 5-7
Unpacked Equipment 4-3
reaker 4-30
Out the Refrigeration System After Burnout ..... 5-10.
acement, Evaporator 5-23
..... 4-40,
Motor Burnout 5-10
Motor Burnout, Diagnosing ..... 5-10.
Motor Relay (K1) 4-32
Test ..... 4-40.
Drainage System 4-23
Coil ..... 4-42.
Coil Guard 4-15
Coil Replacement 5-20
Fan Assembly ..... 4-44.
Fan Guard 4-16
nel 4-24
to Remote Control 4-4.3
..... 1-13
Heater ..... 4-40.

Damper Control, Fresh Air .....
Debrazing .....
Delay Relay, Time (K3) .....
Destruction of Army Materiel to Prevent Enemy Use .....
Diagnosing Compressor Motor Burnout .....
Differences Between Models .....
Discharge Grille, Air .....
Discharge, System .....
Drain Tube Assembly, Lower .....
Drip Pan Assembly .....

E

Elements, Heater .....
Eliminator, Mist .....
Equipment Data .....
Evacuating the System .....
Evaporator Coil .....
Evaporator Coil Replacement .....
Evaporator Fan .....
Expansion Valve, Thermal .....

F

Fans and Motors .....
Fan, Condenser Assembly .....
Fan, Evaporator .....
Fan Motor .....
Fan Speed Switch (S8) .....
Filter, Air .....
Filter Assembly, RFI .....
Filter-Drier (Dehydrator) .....
Fresh Air Damper Control .....
Fresh Air Screen .....
Fuse Replacement .....

G

General .....
  Discription and Use of Operator's Controls and Indicators .....
  Direct Support Maintenance Instructions .....
  General Support Maintenance Instructions .....
  Lubrication Instructions .....
  Maintenance Procedures .....
  Preventive Maintenance Checks and Services (PMCS) ....
  Operation Under Usual Conditions .....
  Operation Under Ununusal Conditions .....

oting 3-2, 4-
5-2

H

..... 1-5
..... 1-15
..... 4-43
kcase 4-40.2
nts 4-43.1
(K2) 4-31
ostat 4-43.2
..... 1-16
re Switch 4-41.1

I

..... 4-4.1
Instructions..... 4-4
Plates 4-22
..... 6-3

J

..... 4-28

L

..... 5-5
eviations 1-6
Description of Major Components 1-9
..... 1-15
Tube Assembly 4-23.2
..... 4-12

M

Forms, Records and Reports 1-2
tor 4-20
t, Compressor 5-10
n 4-44
..... 4-44.3
t 4-17

Operation in Extreme Cold .....
Operation in Extreme Heat .....
Operation Under Rainy or Humid Conditions .....
Operation in Salt Water Area .....

P

Pan Assembly, Drip .....
Panel Assembly, Top .....
Panel, Control .....
Panel, Lower .....
Power Source .....
Preparation for Storage .....
Pressure Control Switch (Fan Speed) .....
Pressure Equalizer Solenoid Valve .....
Pressure Regulating Valve .....
Pressure Relief Valve .....
Pressure Switches .....
Pressure Switch, Hi/Lo .....
Pressure Testing .....
Purpose .....

R

Receiver .....
Receipt, Hand .....
Receptacles .....
Rectifier Assembly (CR1) .....
RFI Filter Assembly .....
Refrigerant Components .....
Refrigerant Tubing .....
Regulating Valve, Pressure .....
Relay Armature (K4 and K5) .....
Relay, Compressor Motor (K1) .....
Relay, Heater (K2) .....
Relay, Time Delay (K3) .....
Relief Valve, Pressure .....
Replacement
  Condenser Coil.....
  Fuse .....
  Sight Glass .....
  Solenoid Valve .....
Reporting Equipment Improvement Recommediations .....
Rotary Selector Switch (S1) .....

Air 4-14
tch, Rotary (S1) 4-25
es 5-19
..... 4-47
..... 4-42.3
Replacement 5-16
ve 4-42.1
ve, Pressure Equalizer 4-42.2
ve Replacement 5-14
..... 4-4.2
or 4-17
Equipment 2-4
Equipment 2-5

(S8) 4-27
sure 4-41.1
ontrol (Fan Speed) 4-41.2
witches 4-41, 5-

ae System 5-7
the System 5-6
charge 5-3

T

Control and Thermostat (S2) 4-26
rds (TB1 and TB2) 4-36

..... 4-40.1
..... 5-5
..... 5-8
nsion Valve 5-22
elay, (K3) 4-33
(T1) 4-35

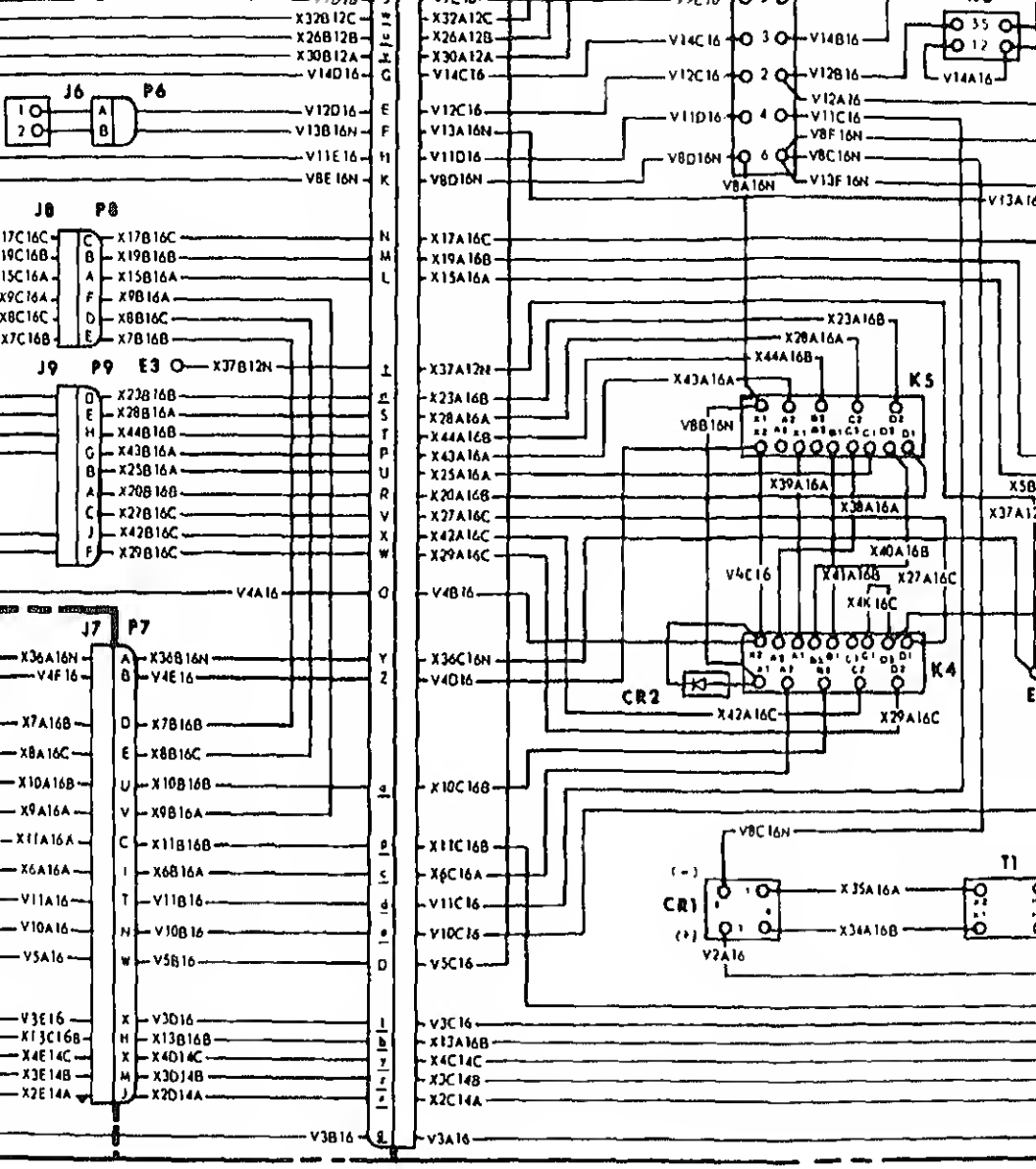
U

..... 4-2

Pressure Equalizer Solenoid .....
Pressure Regulating .....
Pressure Relief .....
Service .....
Solenoid .....
Thermal Expansion .....
Ventilate .....

W

Wire Leads and Wiring Harness .....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P6
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E3
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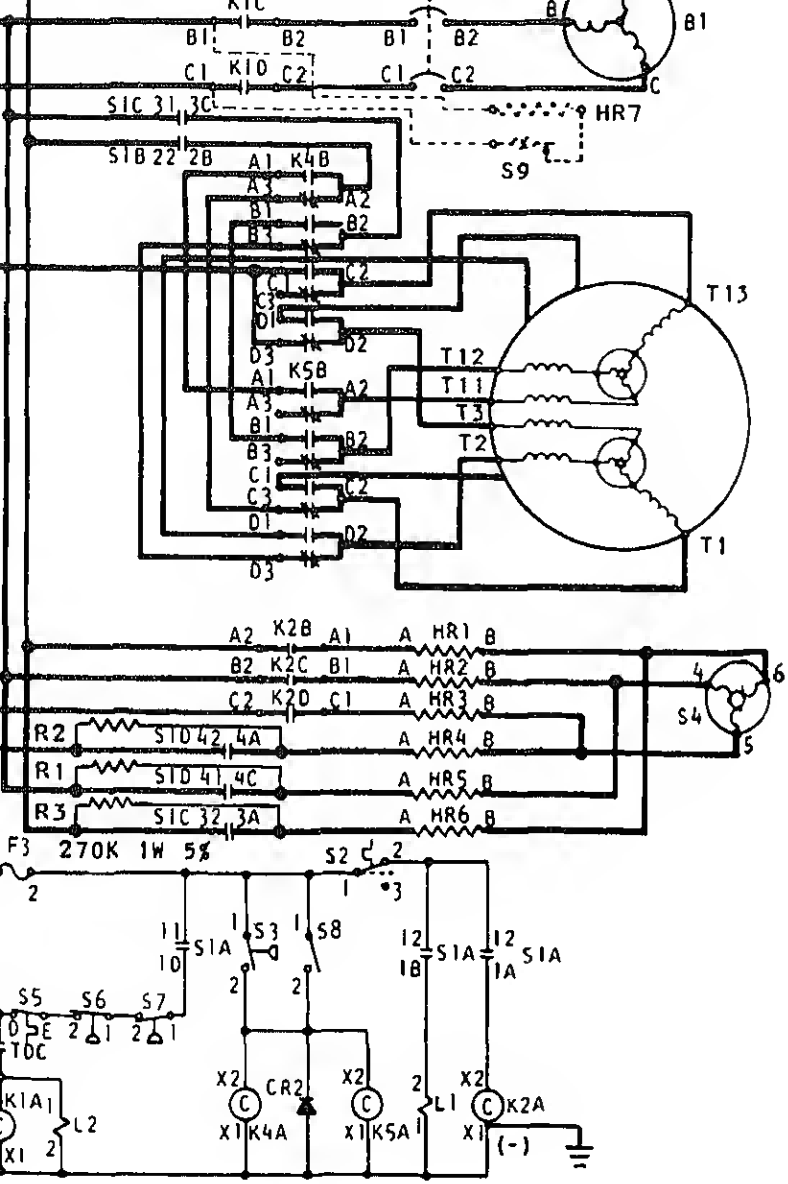
CR2
CR1
T1



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General, United States Army
Chief of Staff

RT M. JOYCE
ral, United States Army
djutant General

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FT LEAVENWORTH, KS

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ACT PIN-POINT WHERE IT IS				IN THIS SPACE TELL WHAT IS WRONG AND WHAT SHOULD BE DONE ABOUT IT:
	PARA-GRAPH	FIGURE NO	TABLE NO	
	2-1 a			In line 6 of paragraph 2-1a manual states the engine 6 Cylinders. The engine on set only has 4 Cylinders. Change the manual to show Cylinders.
		4-3		Callout 16 on figure 4-3 is pointing at a bolt. In the to figure 4-3, item 16 is a shim - Please correct one or the other.
	line 20			I ordered a gasket, item 19 on figure B-16 by NSN 2910-00-762-3001. I got gasket but it doesn't fit Supply says I got what I ordered, so the NSN is Wrong. Please give me a good NSN

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